

METHOD AND SYSTEM FOR CORRELATION OF MOBILE CHANNEL SUBSCRIPTION WITH DELIVERY CONTEXT

[0001] The present method and system relates generally to dynamic content delivery in a mobile environment, and in particular to mechanisms and subscription models for establishing a delivery context for dynamic content.

[0002] Users of mobile devices or mobile user equipment (UE) are increasingly becoming more sophisticated in terms of the functionality that they require from their mobile devices and the way that they access data from the mobile devices.

[0003] Dynamic content delivery allows users to have information or data pushed to them rather than having to go and seek out the data. Examples of data could include stock quotes, weather updates, traffic updates, dynamic wallpaper, ads, applications or other data desirable to a user.

[0004] Current technologies for mobile devices such as wireless application protocol (WAP) have the ability to push content. However, WAP requires websites to be rewritten to satisfy the wireless application protocol and provide users with a uniform site that does not change to accommodate a user's capabilities to view a site.

[0005] Other alternatives include SMS based push and broadcast or cell broadcast. In the broadcast case, delivery cannot be customized to the needs of a particular user or the capabilities of a particular device. The systems therefore have no intelligence associated with them. A better solution is required for mobile devices.

GENERAL

[0006] The present disclosure may provide for a subscription model and topology in which both subscription information and a delivery context is conveyed to a delivery server or a content provider. Specifically, four topologies may be presented. In a first topology, a subscription agent may convey both subscription information and delivery context to a subscription portal. The subscription portal may then propagate the delivery context to a delivery server.

[0007] In a second topology the content client may be aware of delivery context and upon notification of subscription by a subscription agent, the content client propagates the subscription information to a delivery client. The delivery client

may then send a delivery context, along with the subscription identifier, to the delivery server.

[0008] A third topology may include utilizing a delivery client as a proxy in order to add delivery context information to a subscription. The modified subscription request with the delivery context may then be propagated through the subscription portal to the delivery server.

[0009] While registration of the content client with a delivery client is an option for all of the above topologies, a prerequisite for a fourth topology may be a registration model in which an application and a content provider register with a delivery client and delivery server. The subscription by the content client can then be amended at the delivery client to add a delivery context when requesting a subscription.

[0010] In the last topology, a unique channel identifier may be generated upon channel registration by content provider. The inclusion of the channel identifier into a "channel guide" may provide the content client with a menu for selecting among available content. In a preferred embodiment, such a "channel guide" may be provided to the delivery client upon content client registration and include channels matching content client preferences.

[0011] In all of the above topologies "personalized channels" can be created. The common channels are channels in which content may be uniform for all subscribers. Personalized channels are channels in which content may be personalized for a subset of users. An example may be a weather channel in which the common channel is all weather information provided by a weather service provider and the personalized channel is the weather for a particular postal or zip code. With all of the above topologies, the subscription information can include a subscription filter to establish a sub-channel. The subscription filter can be added to the channel identifier to create a subscription identifier. The subscription identifier can take various forms including a unique identifier, an identifier in which the channel identifier is concatenated with the subscription filter or with a representation of the subscription filter.

[0012] The subscription to channels and subscription to "personalized channels" or content subscription can be done in a two-tier subscription model. Specifically, a delivery client and delivery server pair may manage subscriptions at the level of

the channel identifier and may know only of the generic channel. The content client and content provider could conversely have knowledge of subscription details including the sub-channel that the content client is subscribed to.

5 **[0013]** In a further embodiment, sub-channels can be grouped to create “composite” sub-channels or sub-channel bundles. These “composite” sub-channels may be virtual channels and a delivery server can create them for wireless efficiency to combine all content into a single delivery bundle to allow efficiencies and delivery of a group of sub-channels.

10 **[0014]** The present disclosure therefore may provide a method for establishing a delivery context for channel subscription in a mobile network comprising the steps of establishing, from a mobile device in the mobile network, a subscription with a content provider; and passing a delivery context to a delivery server.

15 **[0015]** The present application may further provide a system for establishing a delivery context for channel subscription in a mobile network comprising: a device side, the device side having: a subscription agent; a delivery client; and a content client; and a service side, the service side having: a subscription portal, the subscription portal adapted to communicate with the subscription agent to establish a subscription; a delivery server, the delivery server adapted to communicate with the delivery client in accordance with a delivery context ; and a
20 content provider, the content provider adapted to provide content requested by the content client.

BRIEF DESCRIPTION OF THE DRAWINGS

25 **[0016]** The present disclosure will be better understood with reference to the drawings, in which:

Figure 1 is a block diagram showing logical elements of a content delivery architecture;

Figure 2 is a block diagram showing message flow for establishing a delivery context between the logical elements of **Figure 1**;

30 **Figure 3** is a block diagram showing an alternative message flow for establishing a delivery context between the logical elements of **Figure 1**;

Figure 4 is a block diagram showing an alternative message flow for establishing a delivery context between the logical elements of **Figure 1**;

Figure 5 is a block diagram showing an alternative message flow for establishing a delivery context between the logical elements of **Figure 1**;

Figure 6 is a block diagram showing channel subscription and content subscription flow between elements of a content delivery architecture; and

5 **Figure 7** is a block diagram showing an exemplary mobile device.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0017] Reference is now made to **Figure 1**. **Figure 1** illustrates logical entities both from the device side **110** and a service side **150**.

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[0018] On the device side **110**, logical entities include a subscription agent **112**, a delivery client **114** and a content client **116**.

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[0019] As will be appreciated by those skilled in the art, when discussing dynamic content delivery, a content provider needs to know how to deliver information and what information to deliver. A subscription between a device and a content provider defines a delivery context including how and what to deliver. Thus, an association exists between a subscription context and a delivery context.

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[0020] A subscription agent **112** provides details of the subscription. In one example, a subscription agent can be a browser on the mobile device. However, this is not meant to be limiting and the subscription agent can be part of various applications.

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[0021] A delivery client **114** is preferably a client application on a mobile device and can communicate the delivery context to the server side, as described below.

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[0022] A content client **116** is also an application on the device side and is adapted to receive the requested content based on the subscription. Examples include a video player, a stock ticker or any tool adapted to receive content and process it somehow.

[0023] As will be appreciated by those skilled in the art, subscription agent **112**, delivery client **114** and content client **116** are logical entities. These entities can be combined into one or more applications and a mobile device will not necessarily have to have all three as separate elements.

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[0024] Server side **150** includes a subscription portal **152**, a delivery server **154** and a content provider **156**.

[0025] Subscription portal **152** is adapted to establish a subscription with a
10 subscription agent **112**.

[0026] Content provider **156** provides the content that a mobile device content client **116** desires.

[0027] Delivery server **154** utilizes a delivery context to provide the information
15 from content provider **156** to a mobile device.

[0028] Again, the entities on server side **150**, specifically subscription portal **152**, content provider **156** and delivery server **154**, are logical entities and may exist
20 separately or together. Further, these entities do not need to necessarily exist on the same device and could be spread over various nodes of the network.

[0029] Reference is now made to **Figure 2**. **Figure 2** illustrates a flow chart of the various logical entities from **Figure 1** interacting to set up a subscription channel.

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[0030] In the embodiment of **Figure 2**, subscription agent **212** has information about a subscription. This could include the channel Uniform Resource Identifier (URI), a subscription filter, among others. Subscription agent **212** further includes a delivery context. As will be appreciated, the delivery context could include user
30 and device identities, account information, preferred radio bearers, device capabilities, or other information that a delivery server needs to know in order to deliver content to a device.

[0031] In message **220**, subscription agent **212** provides the subscription information and the delivery context to a subscription portal **252**. The subscription portal **252** could, for example, include a website that subscription agent **212** communicates with. Those skilled in the art would know other examples of a subscription portal.

[0032] When subscription portal **252** receives a subscription message **220**, it receives both the subscription information and the delivery context.

[0033] In the embodiment of **Figure 2**, subscription portal **252** notifies, in message **222**, the content provider **256** of the subscription. Message **222** is a proprietary message between subscription portal **252** and content provider **256**.

[0034] Once content provider **256** receives the subscription information, including delivery context, it then sends the delivery context in message **224** to delivery server **254**. In a preferred embodiment, the content provider **256** creates an external subscription identifier and, if available, sends this identifier along with the delivery context. If a delivery context is not available, information sufficient to create a delivery context at the delivery server **254** is sent. Such information could include, for example, a mobile account number, an international mobile equipment identifier (IMEI), e-mail address, among others.

[0035] In one embodiment, a subscription identifier created by content provider **256** is unique for a mobile device. In an alternative context, the subscription identifier could be shared by multiple devices using the same sub-channel or "personalized channel", as described in more detail below. .

[0036] Delivery server **254** could then optionally provide a notification to delivery client **214** in message **226**, and delivery client **214** could then optionally notify content client **216** using a message **228**. Messages **226** and **228** may be required if content delivery is poll based. Thus, if content retrieval is based on a schedule, on demand, upon content availability notifications among others, then the

notifications in messages **226** and **228** could be sent in order to setup content retrieval rules.

5 **[0037]** Alternatively, if additional actions associated with the subscription are necessary, the notifications in steps **226** and **228** could also be sent. Such actions could include the registration of the content client upon subscription, content filtering on delivery client **214**, among others.

10 **[0038]** In one embodiment, notifications **226** and **228** include a channel identifier to identify the channel for information retrieval from the delivery server **254**.

[0039] The above therefore provides for the establishment of an external subscription where the server provides client subscriber context notification.

15 **[0040]** Reference is now made to **Figure 3**. **Figure 3** shows block diagram of message flow between the logical elements of **Figure 1** in which a content client sets up delivery context.

20 **[0041]** A subscription agent **312** provides, in message **320**, subscription portal **352** with subscription information. Message **320** includes subscription information such as a channel universal resource indicator, subscription filters, among others, but unlike message **220** from **Figure 2**, message **320** does not include a delivery context.

25 **[0042]** A returned subscription identifier is provided by either the subscription portal **352** or the content provider **356** in a message (not shown).

30 **[0043]** Upon receipt of subscription information, subscription portal **352** communicates with content provider **356** through a message **322**. Message **322** is a proprietary message and notifies content provider **356** of the subscription. In the case where the content provider is creating the subscription identifier, the content provider **356** will then provide the subscription identifier back to subscription agent **312**.

[0044] Subscription agent **312** is also aware of content client **316** and, upon receiving a subscription identifier, it can notify the content client **316** directly. In one example, this could involve providing a channel identifier for the subscription to content client **316**.

[0045] Once content client **316** receives proprietary message **324**, including subscription information, it then notifies, in message **328** the delivery client **314** of the subscription identifier. Similarly, content provider **356** notifies delivery server **354** of the subscription identifier in message **330**.

[0046] Once delivery client **314** has subscription information, it also knows information that needs to be sent to the delivery server **354** in order to set up a delivery context. Message **332** is sent from delivery client **314** to delivery server **354** to set the delivery context. The delivery context message can include the subscription identifier. Delivery server **354** may return a channel identifier to identify the channel for content retrieval. As will be appreciated, delivery server **354** may need to combine information from delivery client **314** and content provider **356** to provide the return information to delivery client **314**.

[0047] The above therefore provides for an external subscription in which a delivery context is set up by the content client **316**.

[0048] Reference is now made to **Figure 4**. **Figure 4** illustrates a flow chart of the various logical elements of **Figure 1** where an external subscription is created through a delivery client **414** using the delivery client **414** as a proxy.

[0049] In the example of **Figure 4**, a subscription agent **412** communicates subscription information such as a channel URI, subscription filter, among others in subscription message **420**. A service provider URL is also included.

[0050] As indicated with reference to **Figure 4**, message **420** is passed between subscription agent **412** and delivery client **414**. Subscription agent, however, may

not be aware of the delivery client **414** as a proxy and may merely be attempting to establish a subscription with a subscription portal **452**.

5 **[0051]** The proxy is used for all messages that are being passed from the mobile device and the proxy can be used to insert information in order to assist in the request.

10 **[0052]** Once delivery client **414** receives the subscription message **420**, it can insert delivery context information into the subscription message and then pass the subscription message to subscription portal **452** in a message **422**. A subscription ID may then be returned by either the subscription portal or a content provider **456** in a message (not shown).

15 **[0053]** Upon subscription, delivery client **414** may optionally notify a content client **416** of the subscription in message **432**. In one embodiment, if the content client **416** is registered with the delivery server **454** prior to the subscription, a subscription may trigger a registration process.

20 **[0054]** On the server side, once the subscription portal **452** receives subscription information, including delivery context, from delivery client **414**, it then, in message **426**, notifies content provider **456** of the subscription identifier and the delivery context. Message **426** is preferably a proprietary message between subscription portal **452** and content provider **456**.

25 **[0055]** Content provider **456** then can set up delivery context with delivery server **454** through a message **428**.

30 **[0056]** If subscription portal **452** does not return a channel identifier to the delivery client **414** in response to a message **422**, the delivery server **454** may optionally return the channel identifier to delivery client **414** in message **430**. Alternatively, it could notify the delivery client on that channel identifier.

[0057] The above therefore utilizes the delivery client as a proxy, such as a web proxy, in order to intercept subscription messages and insert information including delivery context information to be passed to the subscription portal. As will be appreciated, this could be used in situations where the subscription agent **412** does not know delivery context information and thus a proxy is needed to provide this information to the subscription portal **452**.

[0058] Reference is now made to **Figure 5**. **Figure 5** is a flow diagram showing subscription channel set up in an infrastructure where registration between a content client and a content provider is performed. Specifically, as illustrated in **Figure 5**, a precondition to subscription channel set up is the registration of a content client **516** with a delivery client **514** and a content provider **556** with a delivery server **554**. The information is then exchanged between delivery server **554** and delivery client **514**. Specifically, delivery client **514** passes registered applications to delivery server **554** and delivery server **554** passes a channel guide to delivery client **514**. The channel guide includes channels that the content client may wish to subscribe to. As will be appreciated by those skilled in the art, the channel guide may be returned by delivery server **554** in response to registration of the content client **516** and may be constructed to include channels matching content client **516** preferences

[0059] Referring to **Figure 5**, when a content client **516** wishes to subscribe to a specific channel, a channel guide is provided to content client **516** in which a channel can be selected. The subscription for the selected channel is passed in message **520** to delivery client **514**. This subscription is then passed to delivery server **554** in message **524**. The delivery server then forwards this message to the content provider **556** in a message **526**.

[0060] As will be appreciated, subscription message **524** can contain the delivery context thereby enabling the content provider **556** to pass the requested information in a requested manner.

[0061] In the above, the subscription identifier includes a channel name, URI identifier, delivery preferences, such as the schedule, and/or a user identity. All of this information is used to identify “a common channel”. As used herein, common channel is used to indicate that all subscribers to the content provider will receive the same information on that channel. For example, a finance news channel, a TV network channel, a podcast channel, a jazz channel, among others.

[0062] Conversely, a “personalized channel” could be used to provide a user with personalized information. Specifically, if a user is interested only in a subset of the information that is provided on a “common channel”, this could be provided in a “personalized channel”. For example, a weather provider may provide weather information for all of North America. A personalized channel for the weather may be to provide weather information for a particular postal or zip code. Further, a user may be only interested in receiving quotes for the stocks of company he or she owns or is watching and therefore may specify a particular subset of all of the stock news and quotes available. A user may request only a subset of television programs available on a TV network channel. Other examples of “personalized channels” would be known to those in the art.

[0063] As indicated with reference to **Figures 2, 3, 4 and 5**, subscription information can include a subscription filter to establish a sub-channel. Thus, for example, a stock quote channel with the channel ID “12345” could be passed on, along with the subscription filter for a specific stock; for example, “symbol=ABCD”. The result of this is that a sub-channel for company ABCD could be passed. The resulting subscription identifier could be a unique identifier for the combination of the channel identifier and subscription filter, for example “1AD543F” or could be formed with a predefined schema such as “12345X001”, or “12345#ABCD”, among others.

[0064] When utilizing personalized channels, the use of the term “channel identifier” is used to identify the “parent” common channel for the sub-channel. The subscription identifier identifies the sub-channel, and as indicated above, could be a unique identifier for the channel identifier with the subscription filter or it

could be a concatenation of the channel identifier and the subscription filter or any other predefined schema.

5 [0065] A personalized channel can be established in various ways. A first method for establishing a personalized channel is to use the set-up illustrated in **Figures 2, 3, 5 or 6**, where the subscription information includes both the channel identifier and a subscription identifier.

10 [0066] In a preferred embodiment, a two-tier model may be used, where the delivery client and delivery server pair may manage subscriptions on the level of the channel identifier. In other words, the delivery client and the delivery server only know about the generic channel.

15 [0067] The content client and content provider conversely have knowledge of specific subscription details such as the subscription filter. The knowledge of the subscription filter is shielded from the delivery client and delivery server. This is best illustrated with an example.

20 [0068] A subscription to a weather channel called "weather.com" is established through one of the flows presented in **Figures 2 to 5**. This includes a channel identifier to identify the weather service.

25 [0069] The delivery client and delivery server know that the content client is subscribed to the channel identifier "weather.com".

[0070] Only the content client and content provider (and possibly the subscription agent and subscription portal) know that the content client is subscribed for weather for the zip code "10016".

30 [0071] The content provider may issue a subscription identifier such as "weather#10016", and associate the sub-channel with devices or users subscribed to the zip code. In order to provide the information to content clients, the content provider has two options.

[0072] A first option is to notify the delivery server on a user or device sub-channel. Specifically, the weather service will notify the delivery server on the “weather#0016” sub-channel. In this case, there is no need to manage users at the content provider and all that is needed is to publish updated forecasts in the delivery server, specifying a subscription ID for that weather forecast.

[0073] A second option is to keep information about sub-channels internally at the content provider and to manage the user device subscriptions outside of the delivery server. The delivery server knows about user subscriptions for channel identifier “weather” in order to engage billing and account validation. However, in this case, the content provider has to publish an updated forecast at the delivery server along with a list of users who need to receive the forecast. As will be appreciated, this second option is not as scalable as the first option.

The above is further illustrated with reference to **Figure 6**. **Figure 6** shows a content provider **656** that communicates with a delivery server **654**. A channel subscription **620** is established based on a channel identifier. Channel subscription **620** is the equivalent of a “common channel” from above.

As illustrated in **Figure 6**, content subscription **622**, content subscription **624** and content subscription **626** are all passed between content provider **656** and **654**. Content subscription **622**, **624** and **626** are each personalized channels from above.

Delivery server **654** communicates with two devices **605** and **610**, who have a delivery client **606** and **614** respectively.

[0074] In communicating with delivery client **606**, the channel subscription **620** is passed. However, in this case, content client **607** of device **605** only requires content subscriptions **622** and **626**, and these are therefore only passed to delivery client **606** and ultimately to content client **607**.

[0075] Conversely, device **610** includes a content client **616** and a delivery client **614**. Content client **616** only requires content subscriptions **624** and **626** and these are passed from delivery server **654** to content client **616** through delivery client **614**.

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[0076] Thus, using a two-tier approach, delivery server **654** and delivery clients **606** and **614** know only that mobile devices **605** and **610** have subscribed to channel **620**. Conversely, content clients **607** and **616**, along with content provider **656** know that mobile device **610** and mobile device **605** require specific content subscriptions. In this case, mobile device wants content subscriptions **622** and **626**, whereas mobile device **610** wants content subscription **624** and **626**.

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[0077] Alternatively, the delivery server **654** may know about this information as well if it is sorting which sub-channels or content subscriptions to send.

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[0078] A further expansion of the above is to create composite sub-channels or sub-channel bundles at the delivery server. The composite sub-channels are “virtual channels” and the delivery server creates them for wireless efficiency to combine into a single delivery bundle the content for a group of sub-channels of the same parent channel. For example, a user may wish to receive certain stock quotes. Specifically, the user wishes to receive stock quotes for companies ABCD, BCDE and CDEF. Other users may also require the combination of these three stock quotes and the delivery server could therefore bundle the stock quotes into a sub-channel. Utilizing the exemplary channel identifier and subscription identifier from above, the bundle could look like “12345#ABCD&BCDE&CDEF”. When passing the bundled sub-channel, stock quotes for all three of the stocks are passed in a single content bundle.

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[0079] As will be appreciated, alternatives to this include a subscription ID for each user. This solution is however unscaleable and adding users creates extra burden on the delivery server and the content provider.

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[0080] A further alternative is to use a sub-channel for each subset of information and a list of users that require the sub-channel. As will be appreciated, bundling the information that is required across multiple users provides efficiencies compared to this.

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[0081] While the above can be implemented on a variety of mobile devices, an example of one mobile device is outlined below with respect to **Figure 7**.

Reference is now made to **Figure 7**.

10 [0082] Mobile device **700** is preferably a two-way wireless communication device having at least voice and data communication capabilities. Mobile device **700** preferably has the capability to communicate with other computer systems on the Internet. Depending on the exact functionality provided, the mobile device may be referred to as a data messaging device, a two-way pager, a wireless e-mail
15 device, a cellular telephone with data messaging capabilities, a wireless Internet appliance, or a data communication device, as examples.

[0083] Where mobile device **700** is enabled for two-way communication, it will incorporate a communication subsystem **711**, including both a receiver **712** and a
20 transmitter **714**, as well as associated components such as one or more, preferably embedded or internal, antenna elements **716** and **718**, local oscillators (LOs) **713**, and a processing module such as a digital signal processor (DSP) **720**. As will be apparent to those skilled in the field of communications, the particular design of the communication subsystem **711** will be dependent upon the
25 communication network in which the device is intended to operate. For example, mobile device **700** may include a communication subsystem **711** designed to operate within the GPRS network or UMTS network.

[0084] Network access requirements will also vary depending upon the type of
30 network **719**. For example, In UMTS and GPRS networks, network access is associated with a subscriber or user of mobile device **700**. For example, a GPRS mobile device therefore requires a subscriber identity module (SIM) card in order to operate on a GPRS network. In UMTS a USIM or SIM module is required. In

CDMA a RUIM card or module is required. These will be referred to as a UIM interface herein. Without a valid UIM interface, a mobile device may not be fully functional. Local or non-network communication functions, as well as legally required functions (if any) such as emergency calling, may be available, but
5 mobile device **700** will be unable to carry out any other functions involving communications over the network **719**. The UIM interface **744** is normally similar to a card-slot into which a card can be inserted and ejected like a diskette or PCMCIA card. The UIM card can have approximately 64K of memory and hold many key configuration **751**, and other information **753** such as identification, and
10 subscriber related information.

[0085] When required network registration or activation procedures have been completed, mobile device **700** may send and receive communication signals over the network **719**. Signals received by antenna **716** through communication
15 network **719** are input to receiver **712**, which may perform such common receiver functions as signal amplification, frequency down conversion, filtering, channel selection and the like, and in the example system shown in **Figure 7**, analog to digital (A/D) conversion. A/D conversion of a received signal allows more complex communication functions such as demodulation and decoding to be
20 performed in the DSP **720**. In a similar manner, signals to be transmitted are processed, including modulation and encoding for example, by DSP **720** and input to transmitter **714** for digital to analog conversion, frequency up conversion, filtering, amplification and transmission over the communication network **719** via antenna **718**. DSP **720** not only processes communication signals, but also
25 provides for receiver and transmitter control. For example, the gains applied to communication signals in receiver **712** and transmitter **714** may be adaptively controlled through automatic gain control algorithms implemented in DSP **720**.

[0086] Network **719** may further communicate with multiple systems, including a
30 server and other elements (not shown). For example, network **719** may communicate with both an enterprise system and a web client system in order to accommodate various clients with various service levels.

[0087] Mobile device **700** preferably includes a microprocessor **738** which controls the overall operation of the device. Communication functions, including at least data communications, are performed through communication subsystem **711**. Microprocessor **738** also interacts with further device subsystems such as the display **722**, flash memory **724**, random access memory (RAM) **726**, auxiliary input/output (I/O) subsystems **728**, serial port **730**, keyboard **732**, speaker **734**, microphone **736**, a short-range communications subsystem **740** and any other device subsystems generally designated as **742**.

10 [0088] Some of the subsystems shown in **Figure 7** perform communication-related functions, whereas other subsystems may provide "resident" or on-device functions. Notably, some subsystems, such as keyboard **732** and display **722**, for example, may be used for both communication-related functions, such as entering a text message for transmission over a communication network, and device-
15 resident functions such as a calculator or task list.

[0089] Operating system software used by the microprocessor **738** is preferably stored in a persistent store such as flash memory **724**, which may instead be a read-only memory (ROM) or similar storage element (not shown). Those skilled in
20 the art will appreciate that the operating system, specific device applications, or parts thereof, may be temporarily loaded into a volatile memory such as RAM **726**. Received communication signals may also be stored in RAM **726**. Further, a unique identifier is also preferably stored in read-only memory.

25 [0090] As shown, flash memory **724** can be segregated into different areas for both computer programs **758** and program data storage **750**, **752**, **754** and **756**. These different storage types indicate that each program can allocate a portion of flash memory **724** for their own data storage requirements. Microprocessor **738**, in addition to its operating system functions, preferably enables execution of
30 software applications on the mobile device. A predetermined set of applications that control basic operations, including at least data and voice communication applications for example, will normally be installed on mobile device **700** during manufacturing. A preferred software application may be a personal information

manager (PIM) application having the ability to organize and manage data items relating to the user of the mobile device such as, but not limited to, e-mail, calendar events, voice mails, appointments, and task items. Naturally, one or more memory stores would be available on the mobile device to facilitate storage of PIM data items. Such PIM application would preferably have the ability to send and receive data items, via the wireless network **719**. In a preferred embodiment, the PIM data items are seamlessly integrated, synchronized and updated, via the wireless network **719**, with the mobile device user's corresponding data items stored or associated with a host computer system. Further applications may also be loaded onto the mobile device **700** through the network **719**, an auxiliary I/O subsystem **728**, serial port **730**, short-range communications subsystem **740** or any other suitable subsystem **742**, and installed by a user in the RAM **726** or preferably a non-volatile store (not shown) for execution by the microprocessor **738**. Such flexibility in application installation increases the functionality of the device and may provide enhanced on-device functions, communication-related functions, or both. For example, secure communication applications may enable electronic commerce functions and other such financial transactions to be performed using the mobile device **700**. These applications will however, according to the above, in many cases need to be approved by a carrier.

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[0091] In a data communication mode, a received signal such as a text message or web page download will be processed by the communication subsystem **711** and input to the microprocessor **738**, which preferably further processes the received signal for output to the display **722**, or alternatively to an auxiliary I/O device **728**. A user of mobile device **700** may also compose data items such as email messages for example, using the keyboard **732**, which is preferably a complete alphanumeric keyboard or telephone-type keypad, in conjunction with the display **722** and possibly an auxiliary I/O device **728**. Such composed items may then be transmitted over a communication network through the communication subsystem **711**.

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[0092] For voice communications, overall operation of mobile device **700** is similar, except that received signals would preferably be output to a speaker **734**

and signals for transmission would be generated by a microphone **736**.

Alternative voice or audio I/O subsystems, such as a voice message recording subsystem, may also be implemented on mobile device **700**. Although voice or audio signal output is preferably accomplished primarily through the speaker **734**, display **722** may also be used to provide an indication of the identity of a calling party, the duration of a voice call, or other voice call related information for example.

[0093] Serial port **730** in **Figure 7** would normally be implemented in a personal digital assistant (PDA)-type mobile device for which synchronization with a user's desktop computer (not shown) may be desirable. Such a port **730** would enable a user to set preferences through an external device or software application and would extend the capabilities of mobile device **700** by providing for information or software downloads to mobile device **700** other than through a wireless communication network. The alternate download path may for example be used to load an encryption key onto the device through a direct and thus reliable and trusted connection to thereby enable secure device communication.

[0094] Alternatively, serial port **730** could be used for other communications, and could include as a universal serial bus (USB) port. An interface is associated with serial port **730**.

[0095] Other communications subsystems **740**, such as a short-range communications subsystem, is a further optional component which may provide for communication between mobile device **700** and different systems or devices, which need not necessarily be similar devices. For example, the subsystem **740** may include an infrared device and associated circuits and components or a Bluetooth™ communication module to provide for communication with similarly enabled systems and devices.

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[0096] The embodiments described herein are examples of structures, systems or methods having elements corresponding to elements of the techniques of this application. This written description may enable those skilled in the art to make

and use embodiments having alternative elements that likewise correspond to the elements of the techniques of this application. The intended scope of the techniques of this application thus includes other structures, systems or methods that do not differ from the techniques of this application as described herein, and
5 further includes other structures, systems or methods with insubstantial differences from the techniques of this application as described herein.

Claims:

1. A method for subscribing to a content channel for delivery of channel content in a dynamic content delivery architecture, comprising the steps of:

establishing, from a mobile device in the mobile network, a channel subscription with a subscription portal, by specifying at least one channel for subscription and by providing at least one of a user identity and a device identity to establish a delivery context, the delivery context including information that a delivery server needs to know in order to deliver content to the mobile device;

receiving at a delivery client on the mobile device, responsive to establishing the channel subscription, a channel subscription notification including at least one channel identifier; and

sending to a content client a notification of subscription including the at least one channel identifier received in the channel subscription notification.

2. The method of claim 1, wherein a browser application on the mobile device performs the establishing step, and wherein the subscription portal is on the mobile network.

3. The method of claim 1 further comprising retrieving channel content of the subscribed channel from the delivery server.

4. The method of claim 3, wherein retrieving channel content further comprises pulling channel content of the subscribed channel from the delivery server.

5. The method of claim 2, wherein the subscription portal propagates information sufficient to create a delivery context to a delivery server after the establishing step.

6. The method of claim 2, wherein the delivery context comprises at least one of: the user identity, the device identity, account information, a mobile account number, an international mobile equipment identifier, a preferred radio bearer, device capabilities and an email address.

7. The method of claim 2, wherein the content client passes the notification of subscription to a delivery client, and the delivery client passes the delivery context to the delivery server upon receipt of the notification of subscription.
8. The method of claim 7, wherein the delivery client propagates a subscription identifier with the delivery context to the delivery server.
9. The method of claim 2, wherein the delivery client on the mobile device is a proxy between the browser application and the subscription portal.
10. The method of claim 9, wherein the delivery client appends the delivery context to communications between the browser application and the subscription portal .
11. The method of claim 9 or claim 10, wherein the delivery client proxy is transparent to the browser application and the subscription portal.
12. The method of any one of claims 1 to 11, wherein prior to the establishing step the method comprises:
 - registering applications on the mobile device with the delivery client; and
 - exchanging registered applications and a channel guide between the delivery client and the delivery server.
13. The method of claim 12, wherein the establishing step comprises selecting a channel from the channel guide .
14. The method of claim 1, wherein information that the delivery server needs to know in order to deliver content to the mobile device includes at least one of a device identity and a user identity that uniquely identifies a target mobile device.

15. A system for establishing a delivery context for channel subscription in a mobile network comprising:

a device side, the device side including:

a subscription agent;
a delivery client; and
a content client; and

a service side, the service side including:

a subscription portal, the subscription portal adapted to communicate with the subscription agent on the device to establish a channel subscription, by specifying at least one channel for subscription and by providing at least one of a user identity and a device identity to establish a delivery context;
a delivery server adapted to receive subscription information and the delivery context associated with the channel subscription, the subscription information containing at least one channel identifier, the delivery server adapted to communicate with the delivery client in accordance with the delivery context associated with the content subscription, the delivery context comprising information that the delivery server needs to know in order to deliver subscribed content to the device side; and
a content provider, the content provider adapted to provide the subscribed content to the content client;

wherein the subscription agent is aware of the content client and is adapted to provide the content client with a notification of subscription including the at least one channel identifier received in the channel subscription notification.

16. The system of claim 15, wherein information that the delivery server needs to know in order to deliver content to the mobile device includes at least one of a device identity and a user identity that uniquely identifies a target mobile device.

17. The system of claim 15, wherein the subscription agent is further adapted to establish the delivery context with the subscription portal at the same time that the subscription is established.

18. The system of claim 17, wherein the subscription portal is adapted to propagate the delivery context to the delivery server.

19. The system of claim 15, wherein the subscription portal is adapted to propagate information sufficient to create the delivery context to the delivery server.

20. The system of claim 19, wherein the information comprises any of a mobile account number, an international mobile equipment identifier or an email address.

21. The system of claim 15, wherein the content client is adapted to pass the notification of subscription to the delivery client and the delivery client is adapted to pass the delivery context to the delivery server upon receipt of the notification of subscription.

22. The system of claim 21, wherein the delivery client is further adapted to propagate a subscription identifier to the delivery server.

23. The system of claim 15, wherein the delivery client is a proxy between the subscription agent and the subscription portal.

24. The system of claim 23, wherein the delivery client is adapted to append the delivery context to communications between the subscription agent and the subscription portal.

25. The system of claim 23 or 24, wherein the delivery client proxy is transparent to the subscription agent and the subscription portal.

26. The system of any one of claims 15 to 25, wherein the content client is adapted to register applications with the delivery client, the content provider is adapted to register channels with the delivery server, the delivery server is adapted to create a channel guide based on the registered channels, and the

delivery server and delivery client are adapted to exchange registered applications and the channel guide.

27. The system of claim 26, wherein the content client is further adapted to select a channel from the channel guide and propagate a subscription request to the content provider.

28. The system of claim 27, wherein the delivery client is adapted to add the delivery context to the subscription request.

29. The system of any one of claims 15 to 28, wherein the subscription agent or the delivery client are adapted to pass a subscription filter, the subscription filter being utilized to request a subset of content available from the content provider.

30. The system of claim 29, wherein the subscription filter and a channel identifier create a subscription identifier to identify the subset of content available.

31. The system of claim 30, wherein the subscription identifier comprises the channel identifier concatenated with the subscription filter or the channel identifier and the subscription filter combined in a predefined schema.

32. The system of any one of claims 29 to 31, wherein the delivery server is adapted to combine multiple subsets of available content to create a bundled sub-channel.

33. The system of any one of claims 29 to 31, wherein the delivery server and delivery client are adapted to manage subscriptions for all content available from the content provider, and wherein the content client and content provider are adapted to manage the subset of content available, thereby creating a two-tier subscription model.

34. The system of claim 33, wherein the content provider is adapted to provide the delivery server with the subset of available content along with a distribution list for mobile devices to deliver the subset of available content to.

35 The system of claim 33, wherein the content provider is adapted to notify the delivery server of the subset of content available along with a subscription identifier for the subset of content available.

36. A method for establishing a delivery context for channel subscription in a dynamic content delivery architecture at a delivery server, comprising the steps of:
receiving subscription information and a delivery context associated with the channel subscription at the delivery server, the subscription information containing at least one channel identifier, the delivery context comprising information that the delivery server needs to know in order to deliver content to a mobile device; and
providing, responsive to receiving the subscription information and the delivery context, a channel subscription notification including the at least one channel identifier to a delivery client at the mobile device identified by the delivery context.

37. The method of claim 36, wherein the subscription information includes a list of subscribed channels.

38. The method of claim 36, wherein information that the delivery server needs to know in order to deliver content to the mobile device includes at least one of a device identity and a user identity that uniquely identifies a target mobile device.

39. The method of claim 36, wherein receiving the delivery context is done at the same time that a subscription is established.

40. The method of claim 36, wherein the delivery context is propagated from a subscription portal to the delivery server.

41. The method of claim 38, wherein the information comprises any of: a mobile account number, an international mobile equipment identifier or an email address.

42. The method of any one of claims 36 to 41, wherein prior to receiving subscription information, the method comprises:

registering channels from content providers with the delivery server, the delivery server creating a channel guide from the registered channels; and
exchanging applications registered with the delivery client and a channel guide between the delivery client and the delivery server.

43. The method of claim 42, wherein receiving subscription information comprises receiving a channel selection from the channel guide, the method further comprising propagating a subscription request to a content provider.

44. A mobile device adapted to perform the method according to any one of claims 1 to 14.

45. A server configured to perform the method according to any one of claims 36 to 43.

46. A computer readable medium storing program code executable by a processor of a computing system for causing said computing system to perform the method of any one of claims 1 to 14.