CONVEYING A CONTENT DELIVERY SCHEDULE TO MOBILE TERMINALS

Claim of Priority under 35 U.S.C. §119

[0001] The present Application for Patent claims priority to Provisional Application No. 60/669,553, filed April 7, 2005, and assigned to the assignee hereof and hereby expressly incorporated by reference herein.

BACKGROUND

Field

[0002] The present application relates generally to the operation of data networks, and more particularly, to methods and apparatus for conveying a delivery schedule to mobile terminals.

Background

[0003] Data networks, such as wireless communication networks, have to trade off between services customized for a single terminal and services provided to a large number of terminals. For example, the distribution of content to a large number of mobile terminals (subscribers) is a complicated problem. This is especially true for mobile terminals that communicate using relatively slow speed over-the-air communication links. Therefore, it is very important for content providers to have a way to deliver content to a variety of mobile terminals in a way that conserves device power and network resources.

[0004] In conventional wired content delivery/media distribution systems, the scheduled broadcast time of real-time or streaming services is known or set. The broadcast time is set to be the time at which the content is advertised to the user as available for viewing. However, in a clip-casting service, a content clip can be delivered to a device at any time as long as it is delivered before the advertised viewing time. The viewing time is defined as the time at which the content clip is advertised to the user as being available for viewing. Once a user has subscribed to a clip-casting service, the delivery of the content clips is performed transparently in the background without requiring any user interaction. The content clips are stored at the device and are made available for viewing at specified times.

[0005] Unfortunately, conventional systems have several disadvantages when trying to deliver content clips to mobile devices. As in traditional IP multicast or other broadcast models, a mobile device can open one or more IP multicast sockets and listen for clips to arrive on the IP multicast sockets. However, this means that a mobile device needs to stay awake all the time to see if there is content arriving (being delivered) for the clip-casting service. Unfortunately, this conventional multicast content reception model does not work well in a mobile environment because mobile devices have limited battery life. Thus, requiring mobile devices to stay awake to listen for content to be received on the multicast sockets would consume significant battery power and reduce mobile standby times.

[0006] Therefore, what is needed is a way to deliver content clips to mobile devices that allows the content clips to be efficiently received while conserving device battery power and thereby minimizing the impact on standby times.

SUMMARY

[0007] In one or more embodiments, a delivery system, comprising methods and apparatus, is provided that operates to deliver a clip delivery schedule to mobile devices. In an embodiment, the clip delivery schedule is delivered in an information message and comprises contact windows that identify when media clips or other content will be available on a delivery network. Once the clip delivery schedule is received at a mobile device, the device can determine when clips are of interest will be available, and then schedule itself to wake up to receive those clips for later viewing by the device operator. Because embodiments of the delivery system allow a device to remain in sleep mode until clips of interest become available, device battery power can be conserved.

[0008] In an aspect, a method for providing a clip delivery schedule is provided. The method comprises receiving a contact window that describes a time interval when a content clip will be available on a distribution network, and determining one or more clips of interest. The method also comprises determining that the content clip matches at least one of the one or more clips of interest, and scheduling a receive time to receive the content clip within the time interval.

[0009] In another aspect, an apparatus for providing a clip delivery schedule is provided. The apparatus comprises communication logic configured to receive a

contact window that describes a time interval when a content clip will be available on a distribution network. The apparatus also comprises processing logic configured to determine one or more clips of interest, and scheduling logic configured to determine that the content clip matches at least one of the one or more clips of interest, and to schedule a receive time to receive the content clip within the time interval.

[0010] In another aspect, an apparatus for providing a clip delivery schedule is provided. The apparatus comprises means for receiving a contact window that describes a time interval when a content clip will be available on a distribution network, and means for determining one or more clips of interest. The apparatus also comprises means for determining that the content clip matches at least one of the one or more clips of interest, and means for scheduling a receive time to receive the content clip within the time interval.

[0011] In another aspect, a computer-readable medium is provided having a computer program, which when executed by at least one processor, operates to provide a clip delivery schedule. The computer program comprises instructions for receiving a contact window that describes a time interval when a content clip will be available on a distribution network, and instructions for determining one or more clips of interest. The computer program also comprises instructions for determining that the content clip matches at least one of the one or more clips of interest, and instructions for scheduling a receive time to receive the content clip within the time interval.

[0012] In another aspect, at least one processor is provided that is configured to perform a method for providing a clip delivery schedule. The method comprises receiving a contact window that describes a time interval when a content clip will be available on a distribution network, and determining one or more clips of interest. The method also comprises determining that the content clip matches at least one of the one or more clips of interest, and scheduling a receive time to receive the content clip within the time interval.

[0013] In another aspect, a method for providing a clip delivery schedule is provided. The method comprises generating a contact window that describes when a content clip will be available on a distribution network, and generating a reception parameter. The method also comprises incorporating the contact window and the reception parameter into an information message, and transmitting the information message.

[0014] In another aspect, an apparatus for providing a clip delivery schedule is provided. The apparatus comprises a contact window generator configured to generate a contact window that describes when a content clip will be available on a distribution network, and to generate a reception parameter. The apparatus also comprises processing logic configured to incorporate the contact window and the reception parameter into an information message, and communication logic configured to transmit the information message.

[0015] In another aspect, an apparatus for providing a clip delivery schedule is provided. The apparatus comprises means for generating a contact window that describes when a content clip will be available on a distribution network, and means for generating a reception parameter. The apparatus also comprises means for incorporating the contact window and the reception parameter into an information message, and means for transmitting the information message.

[0016] In another aspect, a computer-readable medium is provided having a computer program, which when executed by at least one processor operates to provide a clip delivery schedule. The computer program comprise instructions for generating a contact window that describes when a content clip will be available on a distribution network, and instructions for generating a reception parameter. The computer program also comprises instructions for incorporating the contact window and the reception parameter into an information message, and instructions for transmitting the information message.

[0017] In another aspect, at least one processor is provided that is configured to perform a method for providing a clip delivery schedule. The method comprises generating a contact window that describes when a content clip will be available on a distribution network, and generating a reception parameter. The method also comprises incorporating the contact window and the reception parameter into an information message, and transmitting the information message.

[0018] Other aspects of the embodiments will become apparent after review of the hereinafter set forth Brief Description of the Drawings, Description, and the Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The foregoing aspects of the embodiments described herein will become more readily apparent by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

[0020] **FIG. 1** shows a network that comprises an embodiment of a delivery system;

[0021] **FIG. 2** shows an embodiment of a server for use in a delivery system;

[0022] **FIG. 3** shows an embodiment of contact window parameters for use in a delivery system;

[0023] **FIG. 4** shows an embodiment of a method for providing contact windows for use in a delivery system;

[0024] **FIG. 5** shows an embodiment of a mobile device that operates to receive a delivery schedule in a delivery system;

[0025] **FIG. 6** shows an embodiment of a method for operating a device for use in a delivery system;

[0026] **FIG. 7** shows an embodiment of a device suitable for use in a delivery system; and

[0027] **FIG. 8** shows an embodiment of a server suitable for use in a delivery system.

DESCRIPTION

[0028] In one or more embodiments, a delivery system is provided that operates to provide a flexible and efficient mechanism for conveying a clip delivery schedule to mobile devices. In an embodiment, the clip delivery schedule comprises contact windows that identify when multimedia clips or other content will be available over a distribution network to authorized mobile devices. Devices interested in receiving a particular clip may schedule reception of the clip during the appropriate contact window. The device may then operate to conserve power until the clip is scheduled for delivery. The system is especially well suited for use in wireless network environments, but may be used in any type of network environment, including but not limited to, communication networks, public networks, such as the Internet, private networks, such as virtual private networks (VPN), local area networks, wide area networks, long haul networks, or any other type of data network.

[0029] In an embodiment, the clip delivery schedule is conveyed as part of an information message (or "system information") that is delivered to mobile devices on a distribution network. Because the clip delivery schedule allows the devices to schedule the reception of a particular clip, the delivery system eliminates the need for mobile devices to waste power actively monitoring the distribution network waiting for particular clips to become available. As a result, device battery power can be conserved.

[0030] **FIG. 1** shows a network **100** that comprises an embodiment of a delivery system. The network **100** comprises a content distribution system **102** that operates to distribute content over a distribution network **104**. For example, the content distribution system **102** comprises a server **128** that communicates with the network **104** using the communication link **106**, which comprises any suitable type of communication technology. The content distribution system **102** delivers content in the form of multimedia clips or other content that is associated with one or more services. The network **104** may comprise any type of wired and/or wireless networks. The network **104** is in communication with various authorized mobile devices **108**. For example, the devices **108** comprise a PDA **110**, a mobile telephone **112**, and a notebook computer **114**. The network **104** communicates with the devices **108** using wireless communication links **116** that comprise any suitable wireless communication technology. Thus, the distribution network **104** is operable to deliver content clips to any type and/or number of authorized mobile devices.

[0031] In an embodiment, the server **128** comprises contact window logic **118**, which operates to generate contact windows (CW) **120** that identify a time interval when selected clips are to be available over the network **104**. For example, the contact windows **120** define a time interval wherein one or more clips are available to authorized devices on the network **104**. The contact windows **120** are part of a clip delivery schedule that is incorporated into an information message **126** and transmitted to the devices **108**, as shown by path **122**. In an embodiment, the information message **126** is transmitted to device using any suitable type of overhead or other dedicated information channel.

[0032] The contact window logic **118** uses information available at the content distribution system **102** to generate the contact windows **120**. In an embodiment, a contact window comprises the following information.

Contact window start time	The time at which a device can contact the network to download a particular multimedia clip.
Contact window duration	The time interval during which the multimedia clip is available after the contact window start time.
Subscribed memory	The amount of memory required to store the multimedia clip at a device.

[0033] In an embodiment, the contact window logic **118** also generates a reception parameter that is associated with one or more contact windows. The reception parameter describes a time interval within a contact window in which a device should not attempt to obtain the content clip. For example, the reception parameter identifies a percentage of the contact window, for instance 10%. A device attempting to obtain a content clip should not do so within the last 10% of the contact window. For example, the reception parameter allows a device to conserve power since it may not be able to successfully receiving the content clip within 10% of the contact window.

[0034] In an embodiment, authorized devices, such as the mobile telephone **112** comprise scheduling logic (SL) **124**. The scheduling logic **124** operates to extract the contact windows **120** from the information message and determine if the contact windows **120** are associated with content clips of interest. For example, the scheduling logic **124** operates to interact with a device user to determine clips of interest. In another embodiment, clips of interest are determined from the device's current subscription status. If a clip of interest is detected, the scheduling logic **124** operates to schedule a device "wake up" to receive that clip during the contact window associated with that clip. For example, if the mobile telephone **112** is in a power-down standby mode when a clip of interest becomes available on the network **104**, the scheduled wake up causes the mobile telephone **112** to power up to receive the clip of interest. The clip is then stored at the mobile telephone **112** and presented to the device user at a later presentation or "viewing" time.

[0035] Thus, embodiments of the delivery system operate to generate contact windows that identify when selected content clips are available on a distribution network. The contact windows are part of a delivery schedule that is wirelessly conveyed to mobile devices in an information message. When the information message

is received by a mobile device, scheduling logic at the device determines when any clips of interest are to be delivered and schedules a device "wake up." The scheduled wake up allows the device to wake up from a sleep mode to receive the clip of interest when it becomes available. Thus, the delivery system operates to provide a flexible and efficient system for conveying a delivery schedule to mobile devices, and allowing those devices to conserve battery power until clips of interest become available on a distribution network. It should be noted that the network **100** illustrates just one implementation and that other implementations are possible within the scope of the embodiments.

[0036] **FIG. 2** shows an embodiment of a server **200** for use in a delivery system. For example, the server **200** is suitable for use as the server **128** shown in **FIG. 1**. The server **200** comprises processing logic **202**, operator interface I/F logic **204**, communication logic **206**, memory **208**, and contact window generator **212** all coupled to a data bus **210**.

[0037] In one or more embodiments, the processing logic **202** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. Thus, the processing logic **202** generally comprises logic to execute machine-readable instructions and to control or communicate with one or more other functional elements of the server **200** via the internal data bus **210**.

[0038] The communication logic **206** comprises hardware logic and/or software that operate to allow the server **200** to transmit and receive content clips, contact windows, and/or other information with remote devices or systems using communication link **214**. For example, the communication link **214** comprises any suitable type of communication link to allow the server **200** to communicate contact window parameters with other entities of a content distribution system.

[0039] The memory **208** comprises any suitable memory device operable to store any type of information. For example, the memory **208** may comprise RAM, Flash memory, EEPROM, hard disk, and/or any other type of storage device. In an embodiment, the memory **208** operates to store one or more content clips **216** to be distributed over a distribution network, and one or more contact windows **218** that are generated as part of the operation of the server **200**.

[0040] The operator I/F **204** comprises hardware logic and/or software that operate to allow the server **200** to interact with an operator to receive one or more parameters that are used in embodiments of the delivery system. For example, in one or more embodiments, the operator I/F **204** is used to receive operator inputs, or parameters, that are used during operation of the server **200** to generate the contact windows **218**.

[0041] The contact window generator **212** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. In one or more embodiments, the contact window generator **212** operates to receive various parameters (i.e., operator inputs) to generate the contact windows **218**. A more detailed description of the contact windows **218** is provided in another section of this document.

[0042] During operation, the server **200** operates to obtain the clips **216** and/or information about the clips **216** from other entities in a content distribution system using the communication logic **206** and communication link **214**. In an embodiment, information about the clips is obtained from operator inputs that are received through the operator I/F **204**. The information comprises delivery schedule information that describes the distribution of the clips **216** on a distribution network. The contact window generator **212** operates to use this information to generate the contact windows **218** that describe windows in which selected clips will become available on the distribution network.

[0043] The processing logic **202** operates to incorporate the contact windows **218** into one or more information messages. For example, the information messages are used to communicate delivery system information to devices on a distribution network. In an embodiment, the processing logic **202** operates to include the contact windows **218** in a delivery schedule that is conveyed to mobile devices on a network as part of an information message. For example, the information message is transmitted by the communication logic **206** using the communication link **214**.

[0044] In an embodiment, the delivery system comprises a computer program having one or more program instructions ("program instructions") stored on a computer-readable medium, which when executed by at least one processor, for instance, the processing logic **202**, provides the functions described herein. For example, the program instructions may be loaded into the server **200** from a computer-readable medium, such as a floppy disk, CDROM, memory card, FLASH memory

device, RAM, ROM, or any other type of memory device or computer-readable medium that interfaces to the server **200**. In another embodiment, the program instructions may be downloaded into the server **200** from an external device or network resource. The program instructions, when executed by the processing logic **202**, provide embodiments of a delivery system as described herein.

[0045] Thus, the server **200** operates to provide a flexible and efficient mechanism for generating contact windows that are part of a delivery schedule conveyed to mobile devices on a distribution network. It should be noted that the contact window logic **200** illustrates just one implementation and that other implementations are possible within the scope of the embodiments.

[0046] **FIG. 3** shows an embodiment of contact window parameters **300** for use in a delivery system. For example, the parameters **300** may be the parameters **218** shown in **FIG. 2**. In an embodiment, the delivery system conveys the contact window parameters **300** to mobile devices as part of an information message. The contact window parameters **300** indicate that for the given service ID, there can be one or more presentations (i.e., content clips) to be delivered. For each presentation, there can be one or more contact windows. Thus, the parameters **300** identify contact windows for one or more presentations that are associated with one or more services. For example, a service identifier (ID) **302** is provided that identifies a particular service that is associated with one or more presentations of selected content clips. For the service **302**, a number of presentations parameter **304** is provided that indicates how many presentations will occur. For example, a service many have any number of clip presentations associated with it.

[0047] For each service there is at least one presentation ID **306** that identifies a particular presentation. The presentation ID **306** has associated presentation attributes **308** which may describe the presentation, memory requirements, or other attributes of the presentation. Furthermore, for each presentation there is a number of contact windows parameter **310** that identifies the number of contact windows in which the presentation can be received from a distribution network. For example, any content clip may be available on the distribution network during one or more contact windows. It should be noted that there may be multiple presentations associated with any particular service.

[0048] A contact window start time parameter **312** is provided that identifies a start time of a contact window associated with a particular presentation. A contact window duration time parameter **314** is provided that identifies a duration time of the contact window. A reception parameter **316** is provided that indicates a time interval in a contact window in which a device should not attempt to receive a content clip. For example, the reception parameter **316** may be a percentage indicator that indicates a portion of the contact window (located at the end of the contact window) in which a device should not attempt to receive a content clip. For example, the reception parameter **316** indicates a point in time within the contact window, after which, not enough time remains in the contact window to successfully receive a content clip.

[0049] In an embodiment, there may be multiple instances of the parameters **312**, **314**, and **316** to define multiple contact windows in which a particular presentation will be available on a distribution network. Additional parameters may also be provided, such as a memory parameter that indicates the amount of memory a device needs to have to store a particular presentation.

[0050] Therefore, in one or more embodiments, the contact window parameters **300** operate to provide contact window information that can be used by a device to determine when selected content clips will be available on a distribution network. It should be noted that the parameters **300** represent just one implementation and that other implementations are possible within the scope of the embodiments.

[0051] **FIG. 4** shows an embodiment of a method **400** for providing contact windows for use in a delivery system. For example, the method **400** is suitable for use by the server **200** to provide one embodiment of a delivery system. For clarity, the method **400** is described herein with reference to the server **200** shown in **FIG. 2**.

[0052] At block **402**, content clip parameters are obtained. For example, various parameters for one or more content clips associated with one or more services are obtained by the processing logic **202**. In an embodiment, the processing logic **202** communicates with other distribution system entities through the communication logic **206** to obtain the clip parameters. In another embodiment, the processing logic **202** communicates with an operator through the operator I/F **204** to obtain the clip parameters. In an embodiment, the clip parameters comprise information relating to the availability of selected content clips on a distribution network. For example, an operator may specify through the operator I/F **204** that a selected content clip is to be

available each day at a designated time for one hour over the course of one week. The obtained parameters may be stored in the memory **208** and associated with any of the clips **216**.

[0053] At block **404**, contact window parameters and reception parameters are generated for one or more content clips. For example, the contact window generator **212** operates to process the obtained clip parameters to generate one or more contact window parameters for each content clip. The contact window parameters also include one or more reception parameters. For example, the contact window parameters and reception parameters are formatted like the contact window parameters **300** shown in **FIG. 3**. The generated contact window parameters are then stored in the memory, as shown at **218**.

[0054] At block **406**, the generated contact window parameters are incorporated into an information message. For example, the information message comprises system information that provides the latest distribution system updates to devices on a distribution network. In an embodiment, the processing logic **202** operates to incorporate the contact windows **218** into the information message. In another embodiment, the contact window parameters are incorporated into an information message by other entities of a distribution system.

[0055] At block **408**, the information message is distributed to devices on a distribution network. For example, the processing logic **202** controls the communication logic **206** to broadcast the information message on the distribution network using the communication link **214**. For example, the information message may be transmitted over an overhead channel or other dedicated information channel. In another embodiment, the information message is transmitted by other entities of a distribution system.

[0056] At block **410**, content clips are distributed on the distribution network during the specified contact windows. For example, the processing logic **202** operates to control the communication logic **206** to distribute one or more content clips **216** over the distribution network during selected contact windows. For example, each clip is associated with one or more contact windows and the processing logic **202** operates to distribute each clip during its corresponding contact window so that any device interested in receiving a particular clip can do so during its contact window. In another

embodiment, the content clips are distributed on the distribution network by other entities of a distribution system.

[0057] At block **412**, a test is performed to determine if there are any new clip parameters that may add, change, delete, or otherwise modify the contact windows associated with any content clips. For example, new operator inputs may be received through the operator I/F **204** that would cause new contact windows to be generated. If there are new parameters the method proceeds to block **402** to obtain those parameters and generate new contact windows. If there are no new parameters, the method ends at block **414**.

[0058] Thus, the method **400** operates to provide contact windows for use in embodiments of a delivery system. It should be noted that the method **400** is just one implementation and that other implementations are possible within the scope of the embodiments. For example, any of the functions of the method **400** may be added to, changed, deleted, modified, combined, or otherwise adjusted within the scope of the embodiments.

[0059] **FIG. 5** shows an embodiment of a mobile device **500** that operates to receive a clip delivery schedule in a delivery system. For example, the device **500** is suitable for use as the device **112** shown in **FIG. 1**. The device **500** comprises processing logic **502**, operator interface I/F logic **504**, communication logic **506**, and memory **508** all coupled to a data bus **510**. The device **500** also comprises content scheduling logic **512**, which is also coupled to the data bus **510**.

[0060] In one or more embodiments, the processing logic **502** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. Thus, the processing logic **502** generally comprises logic to execute machine-readable instructions and to control or communicate with one or more other functional elements of the device **500** via the internal data bus **510**.

[0061] The communication logic **506** comprises hardware logic and/or software that operate to allow the device **500** to transmit and receive content clips, contact windows, and/or other information with remote devices or systems using communication link **514**. For example, in an embodiment, the communication link **514** comprises any suitable type of communication link to allow the device **500** to receive an information message

over a wireless communication link that comprises one or more contact window parameters, content clips or other information from distribution network.

[0062] The memory **508** comprises any suitable memory device operable to store any type of information. For example, the memory **508** may comprise RAM, Flash memory, EEPROM, hard disk, and/or any other type of storage device. In an embodiment, the memory **508** operates to store one or more receiving parameters **516**, and one or more contact windows **518**. In an embodiment, the receiving parameters **516** comprise parameters that identify content clips of interest to the device **500**.

[0063] The operator I/F **504** comprises hardware logic and/or software that operate to allow the device **500** to interact with an operator to receive one or more parameters that are used in embodiments of the delivery system. For example, in one or more embodiments, the operator I/F **504** is used to receive operator inputs, or parameters, that are used during operation of the delivery system to determine content clips of interest. For example, the received parameters may be the parameters **516**.

[0064] The scheduling logic **512** comprises a CPU, processor, gate array, hardware logic, memory elements, virtual machine, software, and/or any combination of hardware and software. In one or more embodiments, the scheduling logic **512** operates to receive various parameters (i.e., operator inputs) to determine content clips of interest. In an embodiment, the scheduling logic **512** determines clips of interest based on subscription information stored at the device **500**.

[0065] During operation, the device **500** operates to receive an information message comprising a clip delivery schedule that describes one or more content clips having one or more contact windows. The scheduling logic **512** determines clips of interest from operator inputs or based on subscribed services. By comparing information about the clips of interest with information about available clips in the clip delivery schedule, the scheduling **512** determines if any clips of interest will be available on a distribution network. If clips of interest will be available, the scheduling logic **512** operates to schedule a device wake up, so that the device may receive those clips during the appropriate contact window. Any received clips of interest are stored in the memory **508** for later viewing.

[0066] In an embodiment, the scheduling logic **512** operates to process any reception parameters that are associated with any contact windows. For example a reception parameter may indicate a point in time within a contact window after which

the device **500** should not attempt to receive a content clip. The scheduling logic **512** operates to determine if a reception parameter is included with a contact window, and if so, operates to schedule the reception of a content clip within the contact window but before the point in time indicated by the reception parameter. Thus, the clip can be successfully received by the device **500**.

[0067] In an embodiment, the delivery system comprises a computer program having one or more program instructions ("program instructions") stored on a computer-readable medium, which when executed by at least one processor, for instance, the processing logic **502**, provides the functions described herein. For example, the program instructions may be loaded into the device **500** from a computer-readable medium, such as a floppy disk, CDROM, memory card, FLASH memory device, RAM, ROM, or any other type of memory device or computer-readable medium that interfaces to the device **500**. In another embodiment, the program instructions may be downloaded into the device **500** from an external device or network resource. The program instructions, when executed by the processing logic **502**, provide embodiments of a delivery system as described herein.

[0068] Thus, the device **500** operates to provide a flexible and efficient mechanism for receiving a clip delivery schedule in an information message, determining if there are content clips of interest in the delivery schedule, scheduling a wake up during selected contact windows accounting for any reception parameters, and receiving clips of interest for later viewing. It should be noted that the device **500** illustrates just one implementation and that other implementations are possible within the scope of the embodiments.

[0069] **FIG. 6** shows one embodiment of a method **600** for operating a device for use in a delivery system. For example, the method is suitable for use by the device **500** shown in **FIG. 5**. For clarity the method **500** is described herein with reference to the device **500**.

[0070] At block **602**, an information message is obtained by the device **500**. For example, the information message is received in a wireless transmission by the communication logic **506**. The information message comprises a clip delivery schedule that describes content clips that are associated with one or more contact windows. In an embodiment, the contact windows are formatted as shown in **FIG. 3**.

[0071] At block **604**, content clips of interest are determined. In an embodiment, scheduling logic **512** operates to determine content clips of interest. For example, the scheduling logic **512** receives operator input through the operator I/F **504** and uses this input (i.e., parameters **516**) to determine content clips that are of interest to the device user. In another embodiment, the scheduling logic **512** processes service subscription parameters stored at the device that describe the device's current subscription status and uses this information to determiner content clips of interest. For example, content clips related to a subscribed service are flagged as content clips of interest.

[0072] At block **606** a test is performed to determine if clips described in the information message match any of the clips of interest. In an embodiment, the content scheduling logic **512** operates to compare identifiers related to the determined clips of interest to identifiers in the clip delivery schedule provided in the information message. For example, service identifiers in the contact window parameters **300** may match service identifiers associated with determined clips of interest. If a match occurs, then clips identified in the information message are to be received and the method proceeds to block **608**. If a match does not occur, then clips of interest are not available and the method proceeds to block **602**. It should be noted that any technique or process may be used to determine if the contact window parameters in the received information message describe clips of interest to the device. In another embodiment, the contact window parameters are used to determine if any particular content clip already exists on the device. If it is determined that a clip in the received clip delivery schedule already exist on the device, the method proceeds to block **602**.

[0073] At block **608**, contact windows for the clips to be received are obtained. In an embodiment, the scheduling logic **512** operates to obtain the contact windows for the clips to be received from the information message and stores the contact windows in the memory **508**, as shown at **518**.

[0074] At block **610**, reception parameters for the clips to be received are obtained. In an embodiment, the scheduling logic **512** operates to obtain the reception parameters from the information message and store the reception parameters in the memory **508**.

[0075] At block **612**, one or more receive times (or wake up times) are scheduled so that the device can receive content clips of interest. For example, the scheduling logic **512** operates to schedule the receive time to occur within a contact window associated with the content clip to be received. In an embodiment, the reception parameters are

used to determine a time interval within a contact window in which retrieval of a clip should be attempted. For example, the reception parameters indicate a portion of the contact window during which a device should not attempt to retrieve a content clip because there may not be enough time remaining in the contact window to successfully retrieve the clip. Thus, the scheduling logic **512** operates to schedule the device receive time so that the clip can be successfully received.

[0076] At block **614**, the device enters a power-down sleep (standby) mode to conserve battery power. For example, the processing logic **502** operates to place the device in the power down mode. In this mode, the device is still able to wake up at selected times to receive content clips.

[0077] At block **616**, a test is performed to determine if the device should power up to receive one or more content clips. In an embodiment, the processing logic **502** operates to determine if the device needs to wake up to receive a content clip. For example, the processing logic **502** operates to determine if the current time matches a scheduled receive time that is associated with one or more contact windows. If the device does not need to wake up, the method proceeds to block **614**. If the device does need to wake up, the method proceeds to block **618**.

[0078] At block **618**, the device powers up within a selected contact window to receive a selected content clip. For example, the processing logic **502** operates to power up the communication logic **506** to receive a content clip from a distribution network.

[0079] At block **620**, one or more content clips are received. For example, the content clip is transmitted over a distribution network and the communication logic **506** operates to receive the content clip in a wireless transmission using the communication link **514**.

[0080] At block **622**, a test is performed to determine if the device received the content clip during the contact window. In an embodiment, the device **500** may have received the clip during the contact window at the scheduled receive time. In another embodiment, the device **500** may not have received the clip during the contact window because it was out of range and not able to communicate over the network. If the device **500** successfully received the clip, the method proceeds to block **624**. If the device was unable to receive the clip, the method proceeds to block **626**.

[0081] At block **624**, the received clip is stored at the device for later viewing. In an embodiment, the processing logic **502** operates to store the clip in the memory **508**. At

some later presentation time, the processing logic **502** operates to retrieve the stored clip and rendered it on the device. If there are no more clips to receive, the method then ends at block **628**. If there are more clips to receive the method proceeds to block **626**.

[0082] At block **626**, a test is performed to determine if the device needs to receive clip data in a subsequent contact window. For example, in an embodiment, if the device **500** receives the clip in the first contact window without any error, it can go back to sleep. Thus, if the clip is successfully received and then stored at block **624**, the method proceeds to block **614** where the device returns to the power down mode to conserve power until the next scheduled receive time.

[0083] In another embodiment, if the clip is not successfully received or if additional clip data needs to be received, the method proceeds to block **620** to receive more clip data in a subsequent contact window. For example, the device **500** may stay awake or at least monitor a subsequent contact window to receive the clip data. Note that depending on the coding scheme being used for the clip, it is not necessary that the entire content clip be broadcast in every contact window associated with that clip. For example, different portions of a selected content clip can be broadcast over multiple contact windows. In addition, mobile devices need not to stay awake for an entire contact window. As long as a mobile device receives enough information to decode the clip correctly, it does not have to stay awake for the entire contact window.

[0084] Thus, the method **600** provides embodiments of a method for operating a device for use in a delivery system. It should be noted that the method **600** is just one implementation and that other implementations are possible within the scope of the embodiments. For example, any of the functions of the method **600** may be added to, changed, deleted, modified, combined, or otherwise adjusted within the scope of the embodiments.

[0085] **FIG. 7** shows an embodiment of a device **700** suitable for use in a delivery system. For example, the device **700** is suitable for use as the device **112** shown in **FIG. 1**.

[0086] The device **700** comprises means (**702**) for receiving a contact window, means (**704**) for determining clips of interest, means (**706**) for determining a match between a clip of interest and a selected clip, and means (**708**) for scheduling to receive a clip. In one or more embodiments, the means (**702-708**) are provided by at least one processor executing a computer program to provide the functions described herein.

[0087] **FIG. 8** shows an embodiment of a server **800** suitable for use in a delivery system. For example, the server **800** is suitable for use as the server **126** shown in **FIG. 1**.

[0088] The server **800** comprises means (**802**) for generating a contact window, means (**804**) for generating a reception parameter, means (**806**) for incorporating a contact window and a reception parameter into a system information message, and means (**808**) for transmitting a system information message. In one or more embodiments, the means (**802-808**) are provided by at least one processor executing a computer program to provide the functions described herein.

[0089] The various illustrative logics, logical blocks, modules, and circuits described in connection with the embodiments disclosed herein may be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but, in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0090] The steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor, such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components in a user terminal.

[0091] The description of the disclosed embodiments is provided to enable any person skilled in the art to make or use the present invention. Various modifications to these embodiments may be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments, e.g., in an instant messaging service or any general wireless data communication applications, without departing from the spirit or scope of the invention. Thus, the present invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein. The word "exemplary" is used exclusively herein to mean "serving as an example, instance, or illustration." Any embodiment described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments.

[0092] Accordingly, while embodiments of a delivery system have been illustrated and described herein, it will be appreciated that various changes can be made to the embodiments without departing from their spirit or essential characteristics. Therefore, the disclosures and descriptions herein are intended to be illustrative, but not limiting, of the scope of the invention, which is set forth in the following claims.

CLAIMS

WHAT IS CLAIMED IS:

1. A method for providing a clip delivery schedule, the method comprising:

receiving a contact window that describes a time interval when a content clip will be available on a distribution network;

determining one or more clips of interest;

determining that the content clip matches at least one of the one or more clips of interest;

scheduling a receive time within the time interval to receive the content clip.

2. The method of claim 1, further comprising receiving the contact window in an information message.

3. The method of claim 1, further comprising conserving power until the receive time time.

4. The method of claim 1, further comprising waking up from a low power mode at the receive time to receive the content clip.

5. The method of claim 1, further comprising determining the one or more clips of interest based on one or both of an operator input and a device subscription status.

6. The method of claim 1, further comprising:

determining one or more additional contact windows that describe when the content clip will be available on the distribution network; and

receiving the content clip in at least one of the one or more additional contact windows.

7. The method of claim 1, further comprising receiving a reception parameter associated with the contact window.

8. The method of claim 7, further comprising determining whether the content clip can be received within the time interval based on the reception parameter.

9. Apparatus for providing a clip delivery schedule, the apparatus comprising:

communication logic configured to receive a contact window that describes a time interval when a content clip will be available on a distribution network;

processing logic configured to determine one or more clips of interest;

scheduling logic configured to determine that the content clip matches at least one of the one or more clips of interest, and to schedule a receive time to receive the content clip within the time interval.

10. The apparatus of claim 9, wherein said communication logic is configured to receive the contact window in an information message.

11. The apparatus of claim 9, wherein said processing logic is configured to conserve power until the receive time.

12. The apparatus of claim 9, wherein said communication logic is configured to wake up from a low power mode at the receive time to receive the content clip.

13. The apparatus of claim 9, wherein said processing logic is configured to determine the one or more clips of interest based on one or both of an operator input and a device subscription status.

14. The apparatus of claim 9, wherein said scheduling logic is configured to determine one or more additional contact windows that describe when the content clip will be available on the distribution network, and to receive the content clip in at least one of the one or more additional contact windows.

15. The apparatus of claim 9, wherein said scheduling logic is configured to receive a reception parameter associated with the contact window.

16. The apparatus of claim 15, wherein said scheduling logic is configured to determine whether the content clip can be received within the time interval based on the reception parameter.

17. Apparatus for providing a clip delivery schedule, the apparatus comprising:

means for receiving a contact window that describes a time interval when a content clip will be available on a distribution network;

means for determining one or more clips of interest;

means for determining that the content clip matches at least one of the one or more clips of interest;

means for scheduling a receive time to receive the content clip within the time interval.

18. The apparatus of claim 17, further comprising means for receiving the contact window in an information message.

19. The apparatus of claim 17, further comprising means for conserving power until the receive time.

20. The apparatus of claim 17, further comprising means for waking up from a low power mode at the receive time to receive the content clip.

21. The apparatus of claim 17, further comprising means for determining the one or more clips of interest based on one or both of an operator input and a device subscription status.

22. The apparatus of claim 17, further comprising:

means for determining one or more additional contact windows that describe when the content clip will be available on the distribution network; and

means for receiving the content clip in at least one of the one or more additional contact windows.

23. The apparatus of claim 17, further comprising means for receiving a reception parameter associated with the contact window.

24. The apparatus of claim 23, further comprising means for determining whether the content clip can be received within the time interval based on the reception parameter.

25. A computer-readable medium having a computer program, which when executed by at least one processor, operates to provide a clip delivery schedule, the computer program comprising:

instructions for receiving a contact window that describes a time interval when a content clip will be available on a distribution network;

instructions for determining one or more clips of interest;

instructions for determining that the content clip matches at least one of the one or more clips of interest;

instructions for scheduling a receive time to receive the content clip within the time interval.

26. The computer program of claim 25, further comprising instructions for receiving the contact window in an information message.

27. The computer program of claim 25, further comprising instructions for conserving power until the receive time.

28. The computer program of claim 25, further comprising instructions for waking up from a low power mode at the receive time to receive the content clip.

29. The computer program of claim 25, further comprising instructions for determining the one or more clips of interest based on one or both of an operator input and a device subscription status.

30. The computer program of claim 25, further comprising:

instructions for determining one or more additional contact windows that describe when the content clip will be available on the distribution network; and

instructions for receiving the content clip in at least one of the one or more additional contact windows.

31. The computer program of claim 25, further comprising instructions for receiving a reception parameter associated with the contact window.

32. The computer program of claim 31, further comprising instructions for determining whether the content clip can be received within the time interval based on the reception parameter.

33. At least one processor configured to perform a method for providing a clip delivery schedule, the method comprising:

receiving a contact window that describes a time interval when a content clip will be available on a distribution network;

determining one or more clips of interest;

determining that the content clip matches at least one of the one or more clips of interest;

scheduling a receive time to receive the content clip within the time interval.

34. The method of claim 33, further comprising receiving the contact window in an information message.

35. The method of claim 33, further comprising conserving power until the receive time.

36. The method of claim 33, further comprising waking up from a low power mode at the receive time to receive the content clip.

37. The method of claim 33, further comprising determining the one or more clips of interest based on one or both of an operator input and a device subscription status.

38. The method of claim 33, further comprising determining the one or more clips of interest based on a device subscription status.

39. The method of claim 33, further comprising:

determining one or more additional contact windows that describe when the content clip will be available on the distribution network; and

receiving the content clip in at least one of the one or more additional contact windows.

40. The method of claim 39, further comprising determining whether the content clip can be received within the time interval based on the reception parameter.

41. A method for providing a clip delivery schedule, the method comprising:

generating a contact window that describes when a content clip will be available on a distribution network;

generating a reception parameter;

incorporating the contact window and the reception parameter into an information message; and

transmitting the information message.

42. The method of claim 41, wherein said generating the reception parameter comprises generating the reception parameter to indicate a time interval within the contact window in which reception of the content clip should not begin.

43. The method of claim 41, wherein said transmitting comprises transmitting the information message over a wireless network.

44. Apparatus for providing a clip delivery schedule, the apparatus comprising:

a contact window generator configured to generate a contact window that describes when a content clip will be available on a distribution network, and to generate a reception parameter;

processing logic configured to incorporate the contact window and the reception parameter into an information message; and

communication logic configured to transmit the information message.

45. The apparatus of claim 44, wherein said contact window generator is configured to generate the reception parameter to indicate a time interval within the contact window in which reception of the content clip should not begin.

46. The apparatus of claim 44, wherein said communication logic is configured to transmit the information message over a wireless network.

47. Apparatus for providing a clip delivery schedule, the apparatus comprising:

means for generating a contact window that describes when a content clip will be available on a distribution network;

means for generating a reception parameter;

means for incorporating the contact window and the reception parameter into an information message; and

means for transmitting the information message.

48. The apparatus of claim 47, wherein said means for generating the reception parameter comprises means for generating the reception parameter to indicate a time interval within the contact window in which reception of the content clip should not begin.

49. The apparatus of claim 47, wherein said means for transmitting comprises means for transmitting the information message over a wireless network.

50. A computer-readable medium having a computer program, which when executed by at least one processor operates to provide a clip delivery schedule, the computer program comprising:

instructions for generating a contact window that describes when a content clip will be available on a distribution network;

instructions for generating a reception parameter;

instructions for incorporating the contact window and the reception parameter into an information message; and

instructions for transmitting the information message.

51. The computer program of claim 50, wherein said instructions for generating the reception parameter comprise instructions generating the reception parameter to indicate a time interval within the contact window in which reception of the content clip should not begin.

52. The apparatus of claim 50, wherein said instructions transmitting comprise instructions transmitting the information message over a wireless network.

53. At least one processor configured to perform a method for providing a clip delivery schedule, the method comprising:

generating a contact window that describes when a content clip will be available on a distribution network;

generating a reception parameter;

incorporating the contact window and the reception parameter into an information message; and

transmitting the information message.

54. The method of claim 53, wherein said generating the reception parameter comprises generating the reception parameter to indicate a time interval within the contact window in which reception of the content clip should not begin.

55. The method of claim 53, wherein said transmitting comprises transmitting the information message over a wireless network.