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(54) Title: SYSTEM AND METHOD FOR DELIVERING DIGITAL CONTENT ORDERED USING A CUSTOMER-END CABLE TELEVISION INTERFACE

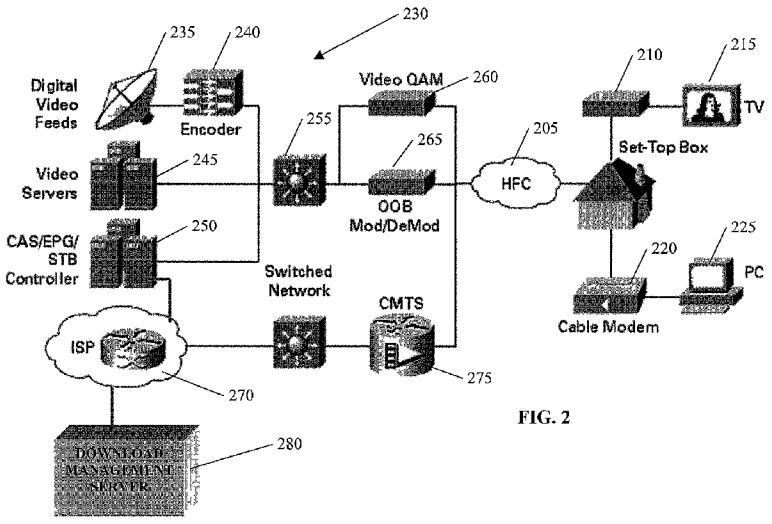

FIG. 2

(57) Abstract: A system and method for delivering digital content ordered using a customer-end cable television interface. A download request is received from a customer for the digital content, the download request being input by the customer using a customer-end cable television interface. The download request is communicated to a server configured to communicate with customer-end computers via an internet protocol-based network. A job poll is received from the client download module of the customer-end computer at the server download management module, via the network. Download of the digital content is initiated to the customer-end computer via the network.

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System And Method For Delivering Digital Content Ordered Using A Customer-End Cable Television Interface

RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Patent Application No. 61/201,258, filed December 9, 2008, which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to a system and method for delivering digital content ordered using a customer-end cable television interface, and more particularly, to a system and method for delivering, via the internet, digital cable television programming content ordered using a cable television set-top box to a storage device associated with a customer's computer or with other internet-connected storage and/or display devices.

BACKGROUND OF THE INVENTION

[0003] Cable operators face increasing competition from technologies that offer customers more control over the programming content they watch and when they watch it. For example, internet-based rental and/or purchase and downloading services, such as Tivo™ and Apple TV™ allow users to access or download desired programming content and watch it almost immediately. However, these internet-based services require the customer to purchase an expensive additional component and connect it to their media system. Aiso, the ordering process takes place over an internet-based interface that is entirely separate from the cable television system, so the user must switch away from the television programming they may be watching to place an order for content over an internet connection. Consequently, a user cannot, for

example, simply choose to purchase and download a television program or movie that they are currently viewing over their cable connection.

[0004] Delivering "unicast" or "narrowcast" streams through the cable television system in response to individual video requests, as opposed to the traditional broadcasting model, places significant demands on the existing cable television distribution infrastructure. The cable infrastructure provides a "return" channel, which is a key component for offering on-demand programming, because it allows two-way communication with individual customers using their set-top box (STB). Cable operators are seeking to leverage this functionality to provide more sophisticated narrowcasting capabilities.

[0005] The return channel is part of existing STB technology, which provides a dedicated channel to transmit control messaging between a headend (which is a subsystem that provides cable television connectivity to a particular neighborhood or region) and customer STBs. This control messaging includes, for example, conditional access (CA), system information (SI), electronic program guide (EPG), and emergency alert system (EAS). These and other STB command and control messages are sent via a downstream radio frequency (RF) channel that is separate from the channels being watched by the viewer and is therefore referred to as an "out-of-band" (OOB) channel. An OOB gateway in the headend system receives content for the OOB channel over an IP/Ethernet connection from an application server and converts the content to ATM or MPEG-TS frames before passing the content through the OOB channel to the STB. A low-

bandwidth, upstream reverse OOB channel provides the return channel for interactive messaging, such as video-on-demand (VOD) ordering.

[0006] Conventional VOD services use point-to-point transport protocols. This results in an architecture in which VOD servers are each connected to one or more modulators, which convert the video signals into RF signals. There is typically a one-to-one correspondence between each video server port of a VOD server and a modulator. In some cases, the VOD servers are installed at a distribution hub, e.g., headend, with local modulators sending the video signals out over the hybrid fiber-coaxial (HFC) network.

[0007] Architectures of this sort have significant limitations, such as difficulty in scaling the system for increasing numbers of subscribers. As more users are added to the system, more modulators are needed to support the additional channels. This in turn results in the need for additional VOD server ports, stream capacity, and network bandwidth configured on a one-to-one ratio with the modulators. Another limitation is that if a particular modulator fails, the VOD server port connected to that modulator becomes unusable and its stream capacity is wasted, because it cannot be sent to other modulators.

[0008] Another limitation in conventional VOD systems is difficulty in the "population of content" process, which refers to the process of loading the video content onto the VOD servers. Each video server can only stream video content to modulators that are connected to it. Therefore, to make a new piece of content available to all users requires populating the content on every video server in the system, which is a time consuming and expensive process. In addition, the limits of VOD server capacity necessarily limits the breadth of

content that can be offered to the customer, i.e., limits the number of titles that can be made available.

SUMMARY OF THE INVENTION

[0009] Disclosed is a method and system for delivering digital content ordered using a cable television set-top box (STB). The system and method may include initiating a transaction via a cable television interface and delivering content from a cable operator through an internet connection to the customer's personal computer (or other internet-connected storage and/or display devices) to allow creating (e.g., "burning") digital video discs (DVDs) or directly recording the content on a hard drive of the computer or other types of a recordable media, such as memory disks or memory sticks. The television interface may be a cable set-top box (STB) provided to each cable subscriber that has been modified to implement the method of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are designed solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims. It should be further understood that the drawings are not necessarily drawn to scale and that, unless otherwise indicated, they are merely intended to conceptually illustrate the structures and procedures described herein. In the drawings:

[001 1] Fig. 1 is a block diagram of a system for delivering digital content ordered using a customer-end cable television interface, according to an embodiment of the present invention;

[0012] Fig. 2 is a more detailed block diagram of a system for delivering digital content ordered using a customer-end cable television interface, according to an embodiment of the present invention; and

[0013] Fig. 3 is a flow chart of a method for delivering digital content ordered using a customer-end cable television interface according to an embodiment of the present invention.

DETAILED DESCRIPTION QF THE EMBODIMENTS

[0014] Fig. 1 shows an example of a system for delivering digital content ordered using a customer-end cable television interface. The customer subscribes to a cable television service provided by a cable provider 105 (or "cable operator"). The customer has a cable television interface, such as a cable set-top box (STB) 110 which receives radio frequency (RF) signals from the cable provider 105 via the cable distribution system 115, e.g., a hybrid fiber-coaxial (HFC) system. The STB 110 provides an user-interface for accessing features of the cable system, such as, for example, the electronic program guide and video-on-demand (VOD) ordering. The STB 110 may also include a cable modem that provides internet connectivity for the customer. An integrated cable modem is depicted in Fig. 1, although it is to be understood that the modem may be a separate component that is directly connected to the HFC system.

[0015] The cable modem may provide an internet connection for the customer's computer 120, in which case the cable provider also serves as the customer's internet service provider (ISP). Alternatively, the customer may use other ways of connecting to the internet, such as, for example, via a telephone system digital subscriber line (DSL), in which case the ISP may be the phone company. The customer's computer includes internal memory storage, e.g., a hard disk 125, and/or other types of memory storage devices, e.g., a digital video disk (DVD) writer 130. A user may also have a mobile terminal, such as a cell phone 135, which may be connected to the internet via the cellular telecommunication network 140.

[0016] As discussed in further detail below, the cable provider may receive a request for digital content from the customer via the STB 110 through the cable system 115. The digital content may then be downloaded to the customer's computer 120 via an internet connection 150 between the cable provider 105 and the customer's computer 120. If the cable provider 105 is not the customer's ISP, then the connection may go through other service providers and/or internet backbones before reaching the customer. In certain embodiments, digital content may be sent to the customer's mobile terminal 135 via a telecommunication network. In certain embodiments, the digital content may reside with a third party provider 155, in which case the content may be retrieved by the cable provider 105 via the internet 150 and downloaded to the customer's computer 120. Alternatively, the cable provider 105 may direct the third party provider 155 to allow download directly to the customer's computer 120 via the internet 150.

[0017] Fig. 2 shows a more detailed block diagram of a system for delivering digital content ordered using a customer-end cable television interface. At the customer end, the hybrid fiber-coax (HFC) system 205 is connected to an STB 210, which is connected to a television 215, and a separate cable modem 220, which is connected to a personal computer 225.

[0018] At the cable provider end, a headend 230 receives digital video feeds via satellite 235. These feeds pass through an encoder 240 which converts the received signals into digital data streams. The digital output of video servers, such as video-on-demand (VOD) servers 245, may be combined with this digital data. Also, control messaging from an out-of-band (OOB) gateway 250, which provides, for example, electronic program guide (EPG) data, may also be combined. The combined data stream may be sent through a switch 255 that sends video data to a video quadrature amplitude modulator (QAM) 260 and OOB data to a separate modulator 265 for transmission over the HFC system 205.

[001 9] If the cable operator is also an internet service provider (ISP), then an ISP subsystem 270 may be provided at the headend 230, or elsewhere in the system. The ISP subsystem 270 may be connected to a cable modem termination system (CTMS) 275, which in turn is connected to the HFC 205 to deliver internet connectivity to the customer via the cable modem 220. The ISP subsystem 270 is connected (connection not shown), for example, to another ISP or to an internet backbone.

[0020] As discussed in further detail below, the cable provider may receive a request for digital content from the customer via the STB 210

through the cable system 205. The digital content may then be downloaded to the customer's computer 225 via an internet connection between the cable provider and the customer's computer 225. The request for digital content may be received via the OOB reverse channel, which is received by the STB controller/OOB gateway 250 in the headend. The STB controller 250 may send the request to a download management server 280 via the internet or via a local network connection if the download management server 280 is co-located with the STB controller 250 in the headend 230.

[0021] The internet connection may be provided by the ISP subsystem 270, as shown in Fig. 2, or by a separate internet connection provided by an outside provider. In an alternative embodiment, the request for digital content may be transmitted by the STB controller 250 to an application server (not shown) in a centralized cable provider facility. The application server may, in turn, communicate with the download management server 280, either via the internet or via a local network connection if the download management server 280 is co-located with the application server.

[0022] The request for digital content may be transmitted from the customer end to the cable provider in various ways other than using the OOB reverse channel. For example, in an alternative embodiment, the STB may send the request to the headend 230, to the application server, or directly to the download management 280 server via the internet. This embodiment may be particularly well-suited for an STB that is internet-enabled and has a built-in cable modem, such that the customer's can be converted into IP data and transmitted directly from the STB via the internet.

Other ways of transmission are also possible, such as, for example, via a telephone connection.

[0023] Fig. 3 shows a block diagram of a method for delivering digital content ordered using a customer-end cable television interface. A download request is received from a customer for the digital content 305. The download request is input by the customer using a customer-end cable television interface such as, for example, a cable television set-top box (STB). The download request is communicated to a server configured to communicate with customer-end computers 310, such as the download management server shown in Fig. 2, via an internet protocol-based network, e.g., the internet.

[0024] The server determines whether the customer is registered to download content by searching a database of registered download customers 315. If the customer is registered, then the server initiates communication between a download management module on the server and a client download module resident on a customer-end computer via the internet to establish a download job for the customer at the server 320.

[0025] If the customer is not registered to download content, then the server initiates communication with the customer to obtain customer registration information 325. There are many ways in which this may be done. For example, the cable provider may have an email address already stored for the customer in a billing system, and the customer may already have given authorization for such email address to be used both for billing and other service-related communications. Or, the cable provider may serve

as the customer's internet service provider and may therefore already have the customer's email address. In such a case, the server may send the customer an email with a link that will allow the customer to register online for access to the digital content.

[0026] After the download management module establishes the download job 320, it waits to receive a job poll from the client download module of the customer-end computer via the internet 330. The download management module and client download module can then initiate download of the digital content to the customer-end computer via the internet in response 335. The download process may be implemented using software such as Video Envoy™ and Video Server Envoy™ is, as discussed below and as described in U.S. Patent Application No. 11/992,512, filed March 21, 2008, which is incorporated herein by reference in its entirety.

[0027] As discussed above, the embodiments of the present invention provide for initiating a transaction via a cable television interface and delivering content from a cable operator through an internet connection to the customer's personal computer to allow creating (e.g., "burning") digital video discs (DVDs) or directly recording the content on a hard drive of the computer or other types of a recordable media, such as a memory disks or memory sticks. The cable television interface may be a cable set-top box (STB) provided to each cable subscriber that has been modified to implement the method of the invention.

[0028] The cable set-top box, and/or its associated remote control, is provided with an order activation and/or "burn" button that is used to provide

an indication to the cable provider that the subscriber wishes to record or store the televised program on an storage device, such as the DVD, memory disk, memory stick or hard drive of the subscriber's computer.

[0029] At the completion of watching a televised program or even during broadcast of the program, the viewer or subscriber can press the actuation or burn button which, in turn, will signal the cable provider to initiate a transaction in a way similar to the way viewers are identified and charged when using conventional video on demand (VOD) technology. In addition, a user may select a program for downloading using the electronic program guide (EPG).

[0030] Selection of digital content to be downloaded may also be made using a separate cable content selection channel similar to a "movies on demand" channel. Such channels allow the user to scroll through available titles to make a selection for downloading. The selection screens may be menu driven using the set-top box remote control and may allow for the user to access additional information about the content before downloading. The selection screens may also present additional choices related to a choice made by the customer.

[0031] in certain embodiments, the selection screens may be triggered by a selection of a program being viewed or a program in the EPG. For example, the customer may select an episode of a series to be downloaded, and the system may then present further menus to the user presenting options to purchase the entire series or related programming. The selection may also trigger switching of the viewed channel to the cable content

selection channel, so that the customer may scroll through related choices among the selection screens. In addition, there may be features such as search and/or menu functions for certain cable channels that allow the customer to order other programs from the same channel when a program from that channel is selected for downloading.

[0032] In accordance with the disclosed method and system, the cable provider possesses the email and IP address of each subscriber's computer. Before being able to store and record the delivered content, each customer, subscriber or viewer is required to download a client module that includes Video Envoy™ software to take advantage of the inventive increased service option. A Video Server Envoy™ may be located at the cable provider and that server may include all cable content, e.g., movies and television programs, etc. Alternatively, the Video Server Envoy™ may be located remotely from the cable provider, but may be accessible to a customer via the internet upon authorization from the cable provider.

[0033] When the customer initiates a request to burn or record a selected program, e.g., by activating the "burn" feature on the cable box or interface, the Video Server Envoy™ connects to the cable box or interface of the subscriber and may send or receive a code to the subscriber's computer as part of an authentication process. The server may also detect whether a storage device is present for saving the selected digital content. If a storage device is not present, an email may be sent from the cable provider to the subscriber, or another form of communication based on the IP address,

instructing the subscriber to provide or designate a storage medium for recording or saving the broadcast program.

[0034] After the recording medium is inserted and/or made available, the subscriber will be prompted to respond by selecting a "reply" feature via the interface, which will instruct the Video Server Envoy™ to begin sending the broadcast content for recordation or storage by the subscriber. The reply function servers as a "job poll" to indicate to the server that the client is ready to receive digital content. Alternatively, a job poll may be automatically sent when the client download module detects that the customer computer is in condition to receive downloadable content.

[0035] The video signal that is subsequently recorded is transmitted by the cable provider such as over the cable connection to the user's recording device. Alternatively, the video signal is sent over the Internet to a USB port or modem associated with the subscriber's computer. A known application that permits such a transfer is Pinnacle Video Transfer, which is manufactured by Pinnacle Systems®.

[0036] In an embodiment, the message provided to the subscriber to notify them to provide a designated storage medium is sent to the cellphone of the subscriber via Short Message Service (SMS) or Multimedia Message Service (MMS) associated with a wireless telecommunications network.

[0037] In another embodiment, the cable providers send the broadcast content over the wireless telecommunications network to the cellphone of the user. Here, the broadcast content is streamed to the cellphone of the user for subsequent storage or recordation on an external device, such as

the portable memory medium, or for further transmission for storage on the computer of the subscriber.

[0038] The cable providers are thereby provided with a system and method for distributing and selling content to subscribers, and the system and method may be provided to other technology providers that can be used to advantageously augment their existing systems.

[0039] In another embodiment, the video library is located at the cable provider and/or at another location in communication with the cable provider. As a result, if the subscriber attempts to receive a broadcast program and his cable provider is, for example, Time Warner Cable, and the movie is owned by Warner Brothers, then Time Warner probably has the rights to the movie and can initiate the transfer. However, if another company owns the movie, Time Warner would be required to pass the download request to another library pursuant to a fee sharing arrangement. Alternatively, Time Warner could provide the content to the user and pay the content owner a percentage of the fee collected from the user.

[0040] Thus, while there are shown, described and pointed out fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit of the invention. Moreover, it should be recognized that structures shown and/or described in connection with any disclosed form or embodiment of the invention may be incorporated in any other

disclosed or described or suggested form or embodiment as a general matter of design choice.

CLAIMS

1. A method for delivering digital content ordered using a customer-end cable television interface, the method comprising:

receiving from a customer a download request for the digital content, the download request being input by the customer using a customer-end cable television interface;

communicating the download request to a server configured to communicate with customer-end devices via an internet protocol-based network;

determining whether the customer is registered to download content by searching a database of registered download customers;

initiating communication between a download management module on the server and a client download module resident on a customer-end device via the network, if the customer is registered to download content, to establish a download job for the customer at the server;

initiating communication with the customer, if the customer is not registered to download content, to obtain customer registration information;

receiving, at the server download management module, via the network a job poll from the client download module of the customer-end device;

initiating download of the digital content to the customer-end device via the network in response to the download job poll.

2. The method of claim 1, wherein the download request for the digital content is received from an out-of-band (OOB) gateway at a cable operator headend.

3. The method of claim 1, wherein the download request for the digital content is received from a cable operator application server which is connected to an out-of-band (OOB) gateway at a cable operator headend.

4. The method of claim 1, wherein the download request is input by the customer using the customer-end cable television interface by selecting a program being viewed.

5. The method of claim 1, wherein the download request is input by the customer using the customer-end cable television interface by selecting a program from an electronic program guide.

6. The method of claim 1, further comprising retrieving the requested digital content from a third-party server.

7. The method of claim 1, further comprising sending a message to the customer if a storage device of the customer-end device is not available.

8. The method of claim 1, wherein the download job specifies the requested digital content and an internet address of the customer-end device.

9. The method of claim 1, wherein the customer registration information includes an email address of the customer and an internet address of the customer-end device.

10. The method of claim 1, wherein the customer-end cable television interface is a cable television set-top box.

11. The method of claim 1, further comprising accessing a billing system of the customer's cable television system operator to bill the customer for the requested digital content.

12. The method of claim 1, wherein the communication with the customer to obtain customer registration information comprises sending an email to a customer email address obtained from a cable television billing system.

13. The method of claim 1, wherein the customer-end device is a computer.

14. A system for delivering digital content ordered using a cable television interface, the system comprising:

a server configured to communicate with customer-end devices via an internet protocol-based network and comprising a download management module and a database of registered download customers, the server being configured to:

receive a download request for the digital content, the download request having been input by the customer using a customer-end cable television interface;

determine whether the customer is registered to download content by searching the database of registered download customers;

initiate communication between the download management module and a client download module resident on a customer-end device via the network, if the customer is registered to download content, to establish a download job for the customer, the download job specifying the requested digital content and an internet address of the customer-end device;

initiate communication with the customer, if the customer is not registered to download content, to obtain customer registration information, the customer registration information including an email address of the customer and an internet address of the customer-end device;

receive, at the server download management module, via the network a job poil from the client download module of the customer-end device; and

initiate download of the digital content to the customer-end device via the network in response to the download job poli.

15. The system of claim 14, wherein the download request for the digital content is received from an out-of-band (OOB) gateway at a cable operator headend.

16. The system of claim 14, wherein the download request for the digital content is received from a cable operator application server which is connected to an out-of-band (OOB) gateway at a cable operator headend.

17. The system of claim 14, wherein the requested digital content is received from a third-party server.

18. The system of claim 14, wherein the download job specifies the requested digital content and an internet address of the customer-end device.

19. The system of claim 14, wherein the customer registration information includes an email address of the customer and an internet address of the customer-end device.

20. The system of claim 14, wherein the customer-end cable television interface is a cable television set-top box.

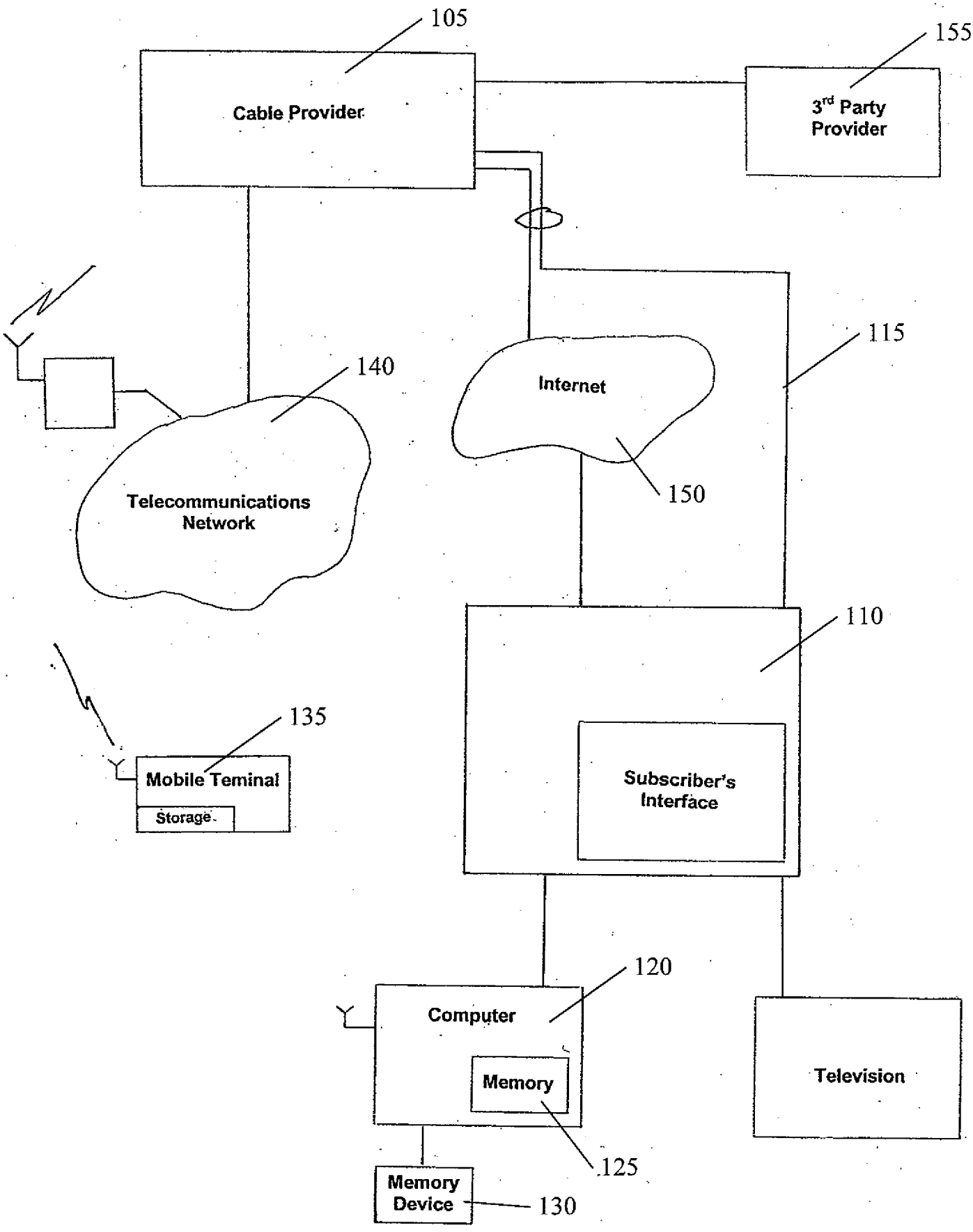
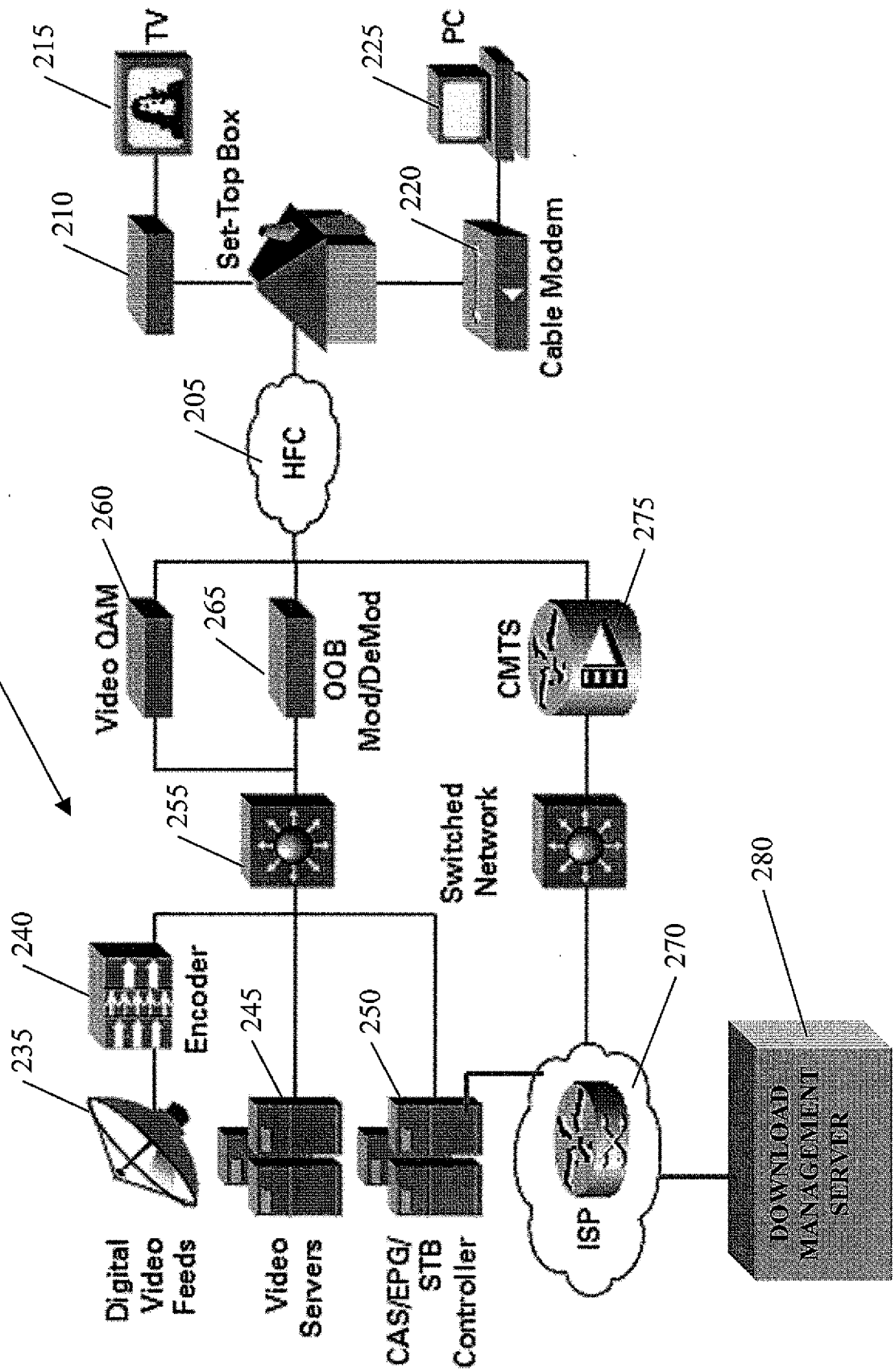

105
Cable Provider
155
3rd Party Provider
115
140
Internet
Telecommunications Network
150
110
135
Mobile Teminal
Storage
Subscriber's Interface
120
Computer
Memory
Television
125
Memory Device
130

FIG. 1


215
TV
210
Set-Top Box
225
PC
220
Cable Modem
205
HFC
260
Video QAM
265
OOB
Mod/DeMod
275
CMTS
230
255
Switched
Network
240
Encoder
235
245
250
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Video
Feeds
Video
Servers
CAS/EPG/
STB
Controller
ISP
DOWNLOAD
MANAGEMENT
SERVER

FIG. 2

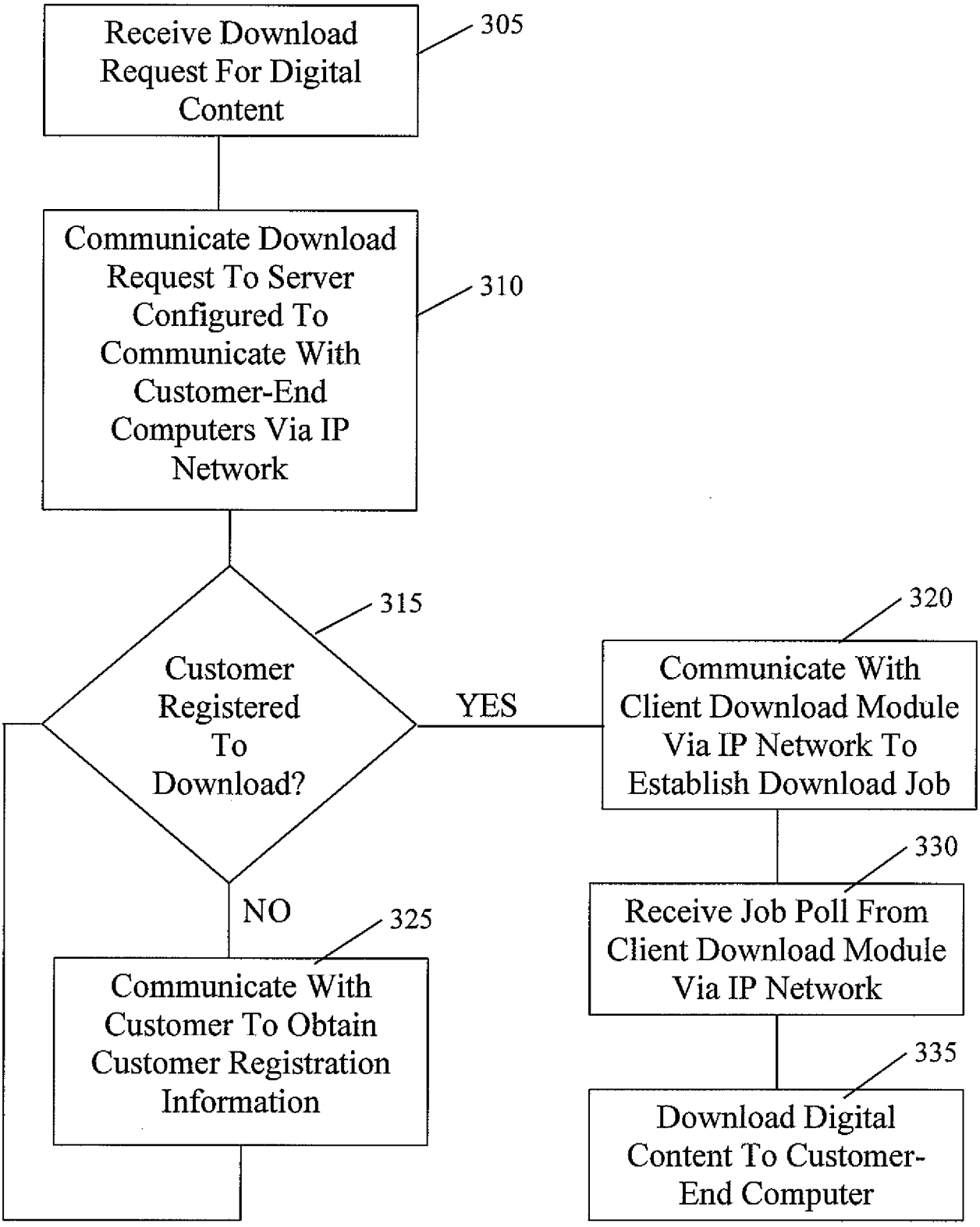
Receive Download Request For Digital Content
305
Communicate Download Request To Server Configured To Communicate With Customer-End Computers Via IP Network
310
Customer Registered To Download?
315
YES
NO
Communicate With Client Download Module Via IP Network To Establish Download Job
320
Receive Job Poll From Client Download Module Via IP Network
330
Download Digital Content To Customer-End Computer
335
Communicate With Customer To Obtain Customer Registration Information
325

FIG. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/067317

A CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04N 7/1 6 (201 0.01)
USPC - 705/27
According to International Patent Classification (IPC) or to both national classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - H04N 7/16 (2010 01)
USPC - 705/27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Google Patents, PatBase

C DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	US 2003/0139980 A1 (HAMILTON) 24 July 2003 (24 07 2003) entire document	1-20
Y	US 2007/0094691 A1 (GAZDZINSKI) 26 April 2007 (26 04 2007) entire document	1-20

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