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Aldrey et al.

(54) **METHOD AND APPARATUS FOR REMOTE SET-TOP BOX MANAGEMENT**

(75) Inventors: **Raul Aldrey**, Dallas, TX (US); **Abhishek Gupta**, Dallas, TX (US); **Anil Solleti**, Irving, TX (US); **Enrique Ruiz Velasco Fonseca**, Flower Mound, TX (US); **Laxmi Patel**, Irving, TX (US); **Pericharla Anjaneya**, Irving, TX (US); **Sudeep Dasgupta**, Irving, TX (US)

Correspondence Address:
VERIZON
PATENT MANAGEMENT GROUP
1320 North Court House Road, 9th Floor
ARLINGTON, VA 22201-2909 (US)

(73) Assignee: **Verizon Data Services Inc.**, Temple Terrace, FL (US)

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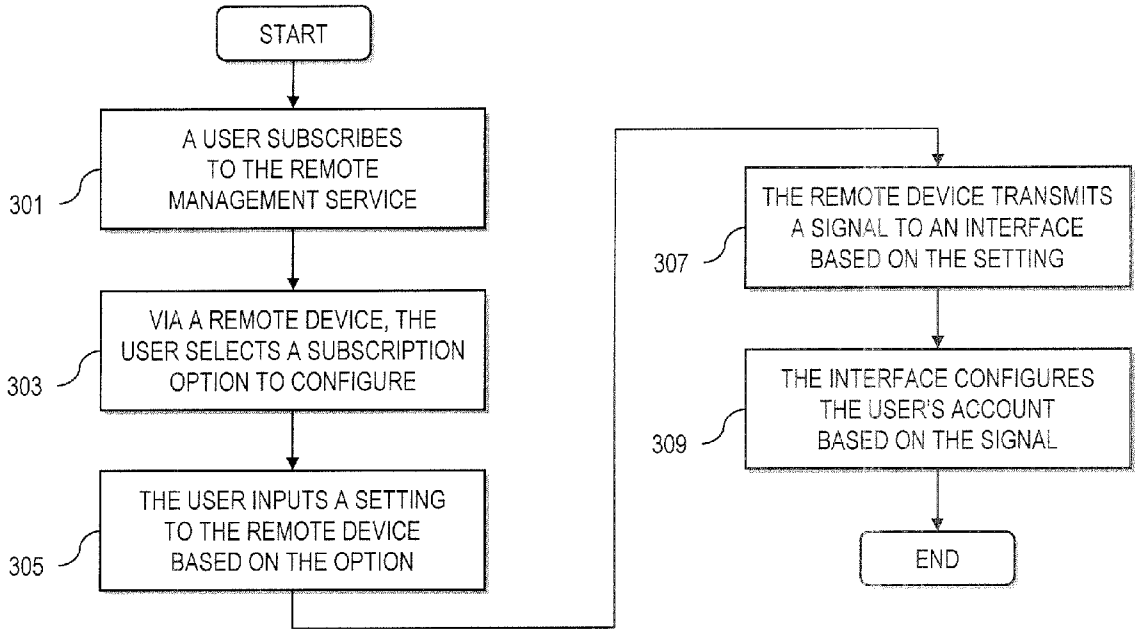
(57) **ABSTRACT**

An approach is provided for remotely controlling set-top boxes. A command is received from a computing device for controlling a plurality of set-top boxes. The set-top boxes are configured according to the received command.



Charter Ex. 1115

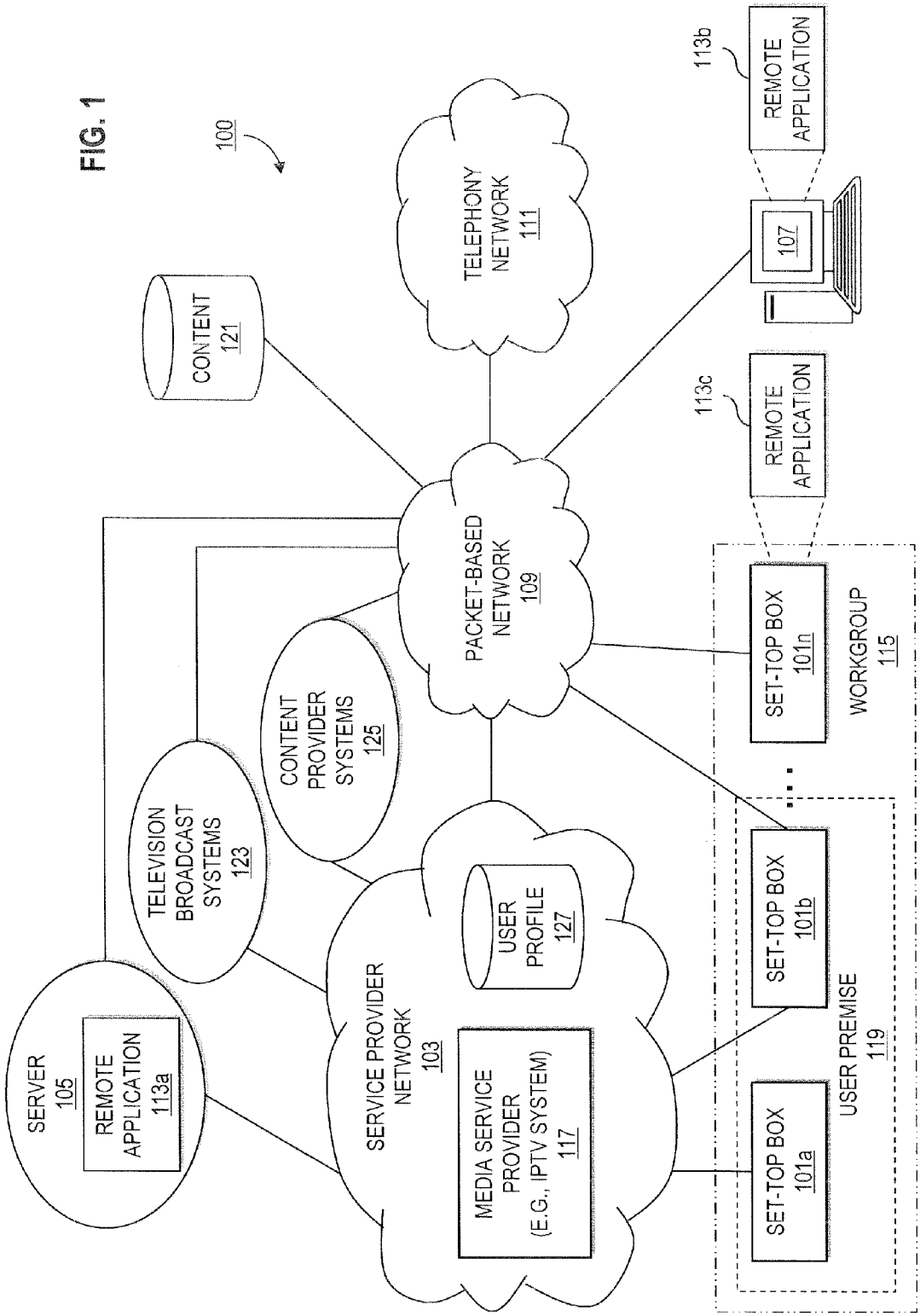

100
CONTENT
121
TELEPHONY
NETWORK
111
113b
REMOTE
APPLICATION
107
113c
REMOTE
APPLICATION
PACKET-BASED
NETWORK
109
SET-TOP BOX
101n
WORKGROUP
115
CONTENT
PROVIDER
SYSTEMS
125
TELEVISION
BROADCAST
SYSTEMS
123
USER
PROFILE
127
SET-TOP BOX
101b
USER PREMISE
119
SERVER
105
REMOTE
APPLICATION
113a
SERVICE PROVIDER
NETWORK
103
MEDIA SERVICE
PROVIDER
(E.G., IPTV SYSTEM)
117
SET-TOP BOX
101a

FIG. 1

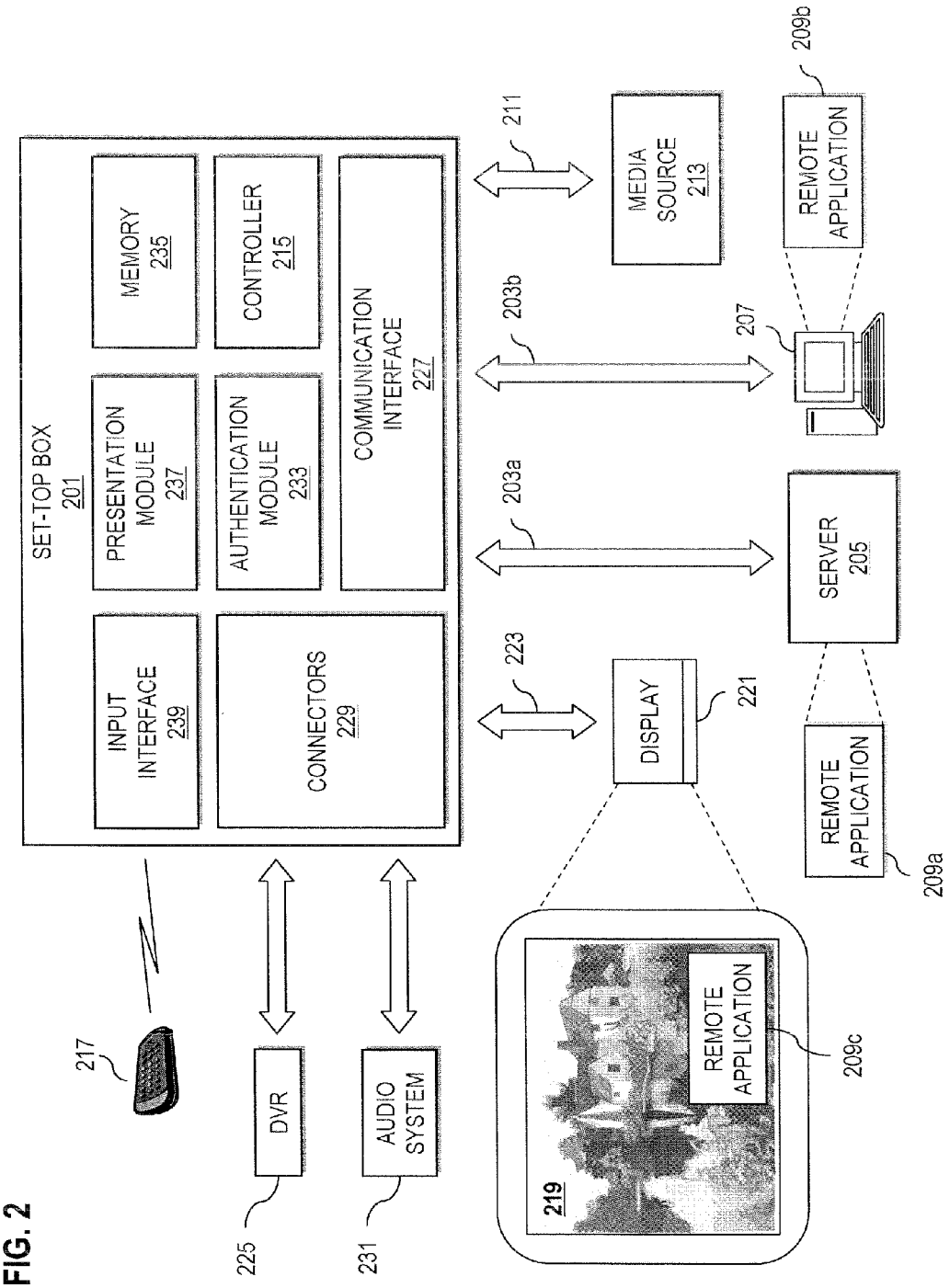
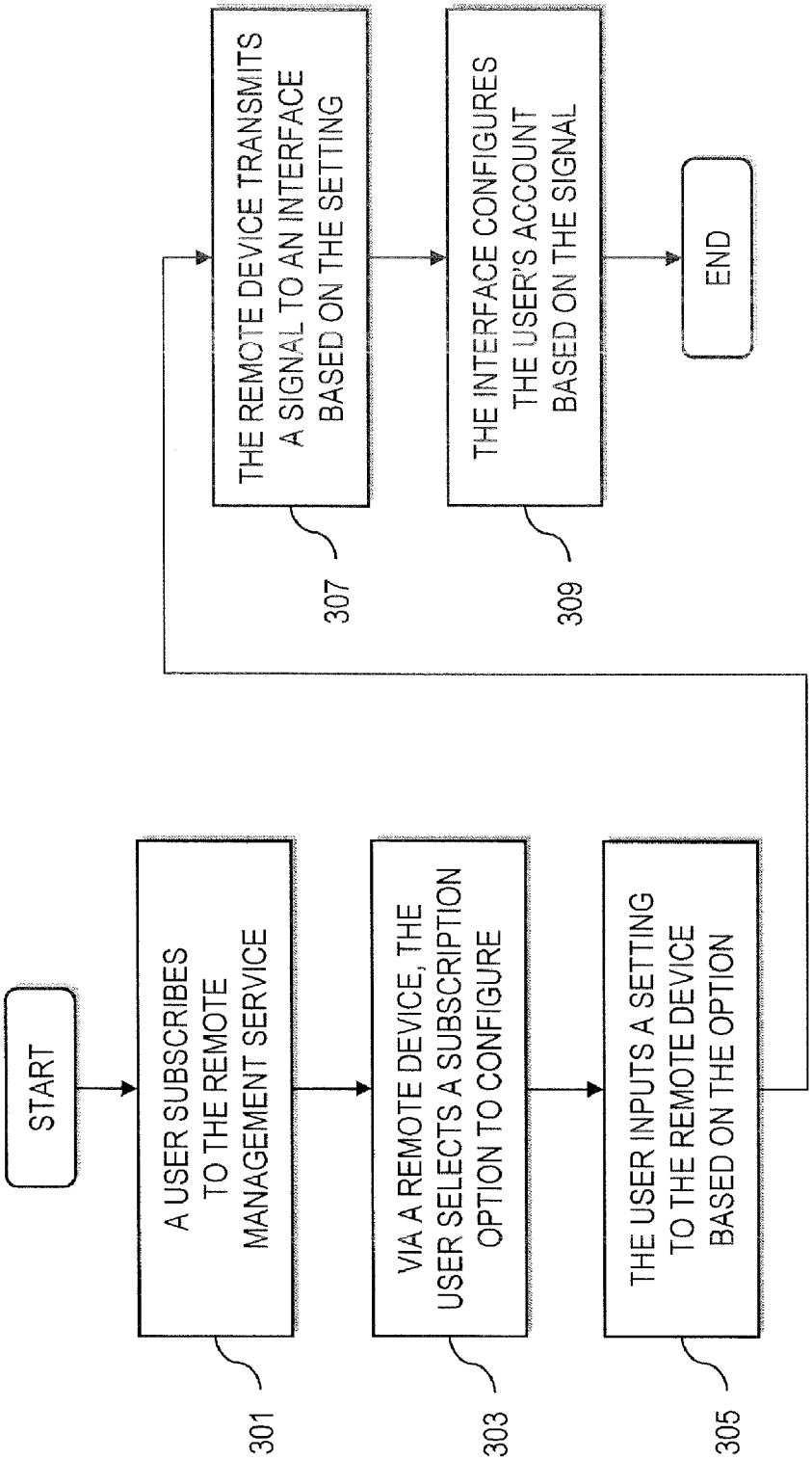

SET-TOP BOX
201
MEMORY
235
CONTROLLER
215
PRESENTATION MODULE
237
AUTHENTICATION MODULE
233
COMMUNICATION INTERFACE
227
INPUT INTERFACE
239
CONNECTORS
229
211
MEDIA SOURCE
213
REMOTE APPLICATION
209b
203b
207
203a
SERVER
205
223
DISPLAY
221
REMOTE APPLICATION
209a
217
DVR
AUDIO SYSTEM
225
231
219
REMOTE APPLICATION
209c

FIG. 2

FIG. 3


START
A USER SUBSCRIBES TO THE REMOTE MANAGEMENT SERVICE
301
VIA A REMOTE DEVICE, THE USER SELECTS A SUBSCRIPTION OPTION TO CONFIGURE
303
THE USER INPUTS A SETTING TO THE REMOTE DEVICE BASED ON THE OPTION
305
THE REMOTE DEVICE TRANSMITS A SIGNAL TO AN INTERFACE BASED ON THE SETTING
307
THE INTERFACE CONFIGURES THE USER'S ACCOUNT BASED ON THE SIGNAL
309
END

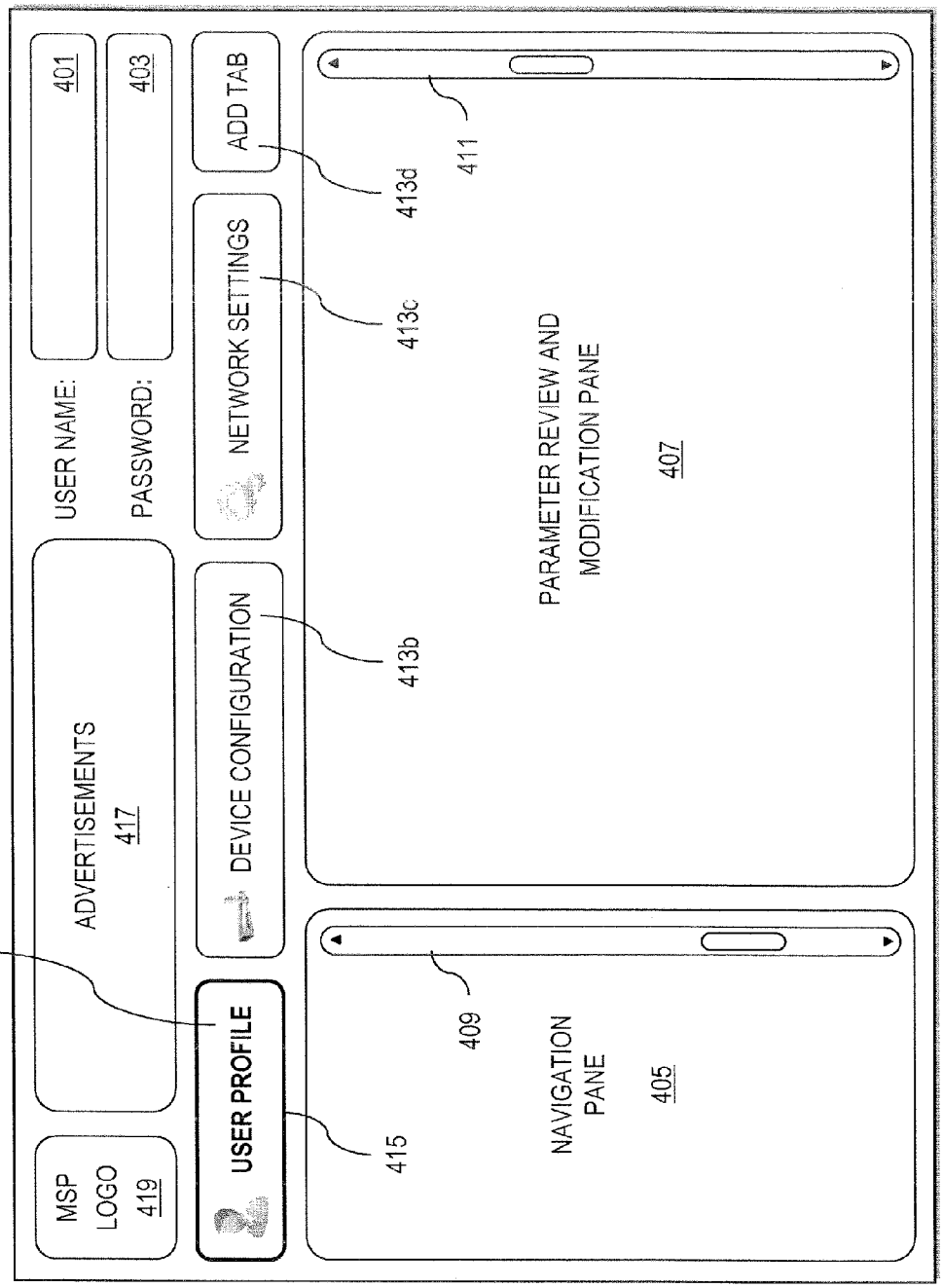

400
MSP LOGO 419
ADVERTISEMENTS 417
USER NAME:
401
PASSWORD:
403
USER PROFILE
DEVICE CONFIGURATION
NETWORK SETTINGS
ADD TAB
413a
413b
413c
413d
415
NAVIGATION PANE 405
409
PARAMETER REVIEW AND MODIFICATION PANE 407
411

FIG. 4

FIG. 5b

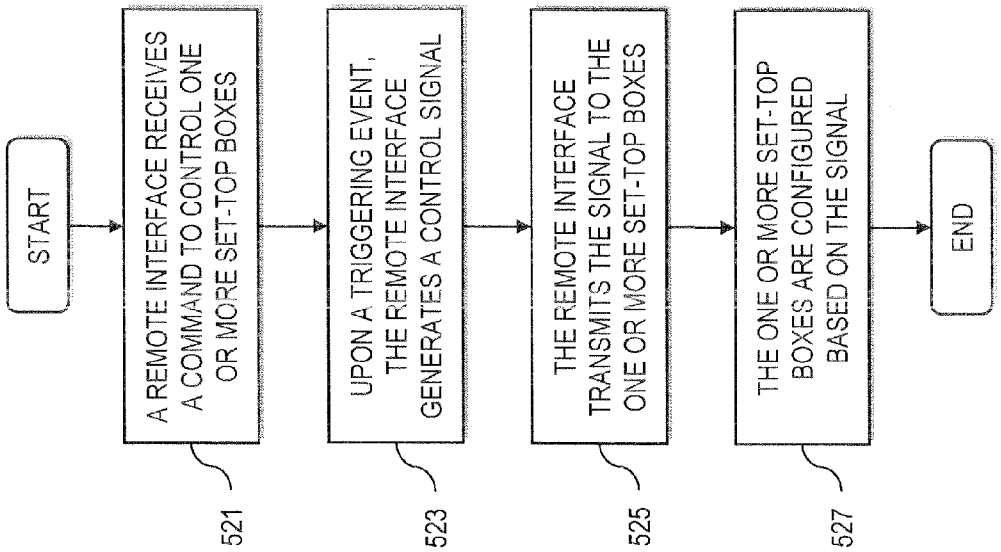
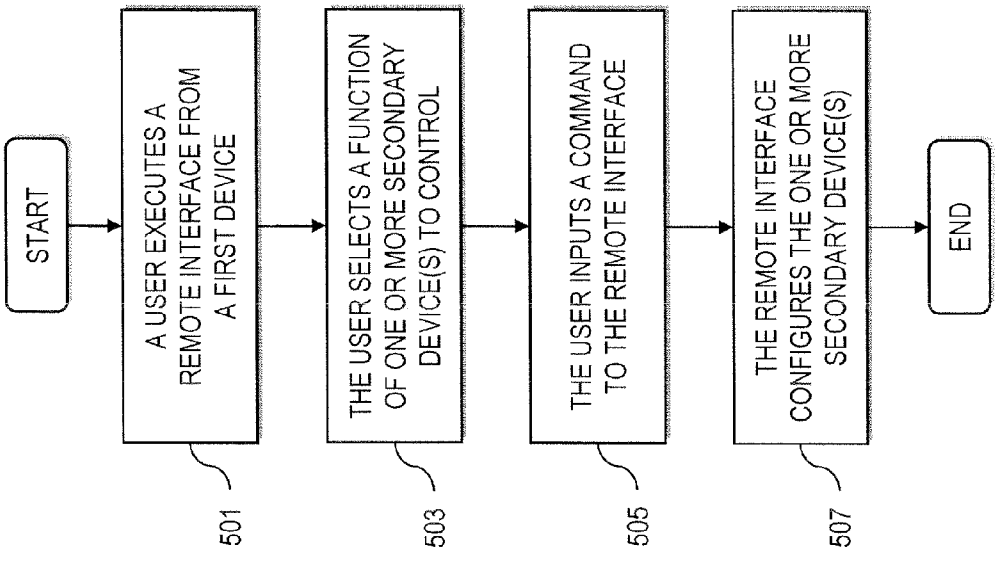

START
A REMOTE INTERFACE RECEIVES A COMMAND TO CONTROL ONE OR MORE SET-TOP BOXES
521
UPON A TRIGGERING EVENT, THE REMOTE INTERFACE GENERATES A CONTROL SIGNAL
523
THE REMOTE INTERFACE TRANSMITS THE SIGNAL TO THE ONE OR MORE SET-TOP BOXES
525
THE ONE OR MORE SET-TOP BOXES ARE CONFIGURED BASED ON THE SIGNAL
527
END

FIG. 5a


START
A USER EXECUTES A REMOTE INTERFACE FROM A FIRST DEVICE
501
THE USER SELECTS A FUNCTION OF ONE OR MORE SECONDARY DEVICE(S) TO CONTROL
503
THE USER INPUTS A COMMAND TO THE REMOTE INTERFACE
505
THE REMOTE INTERFACE CONFIGURES THE ONE OR MORE SECONDARY DEVICE(S)
507
END

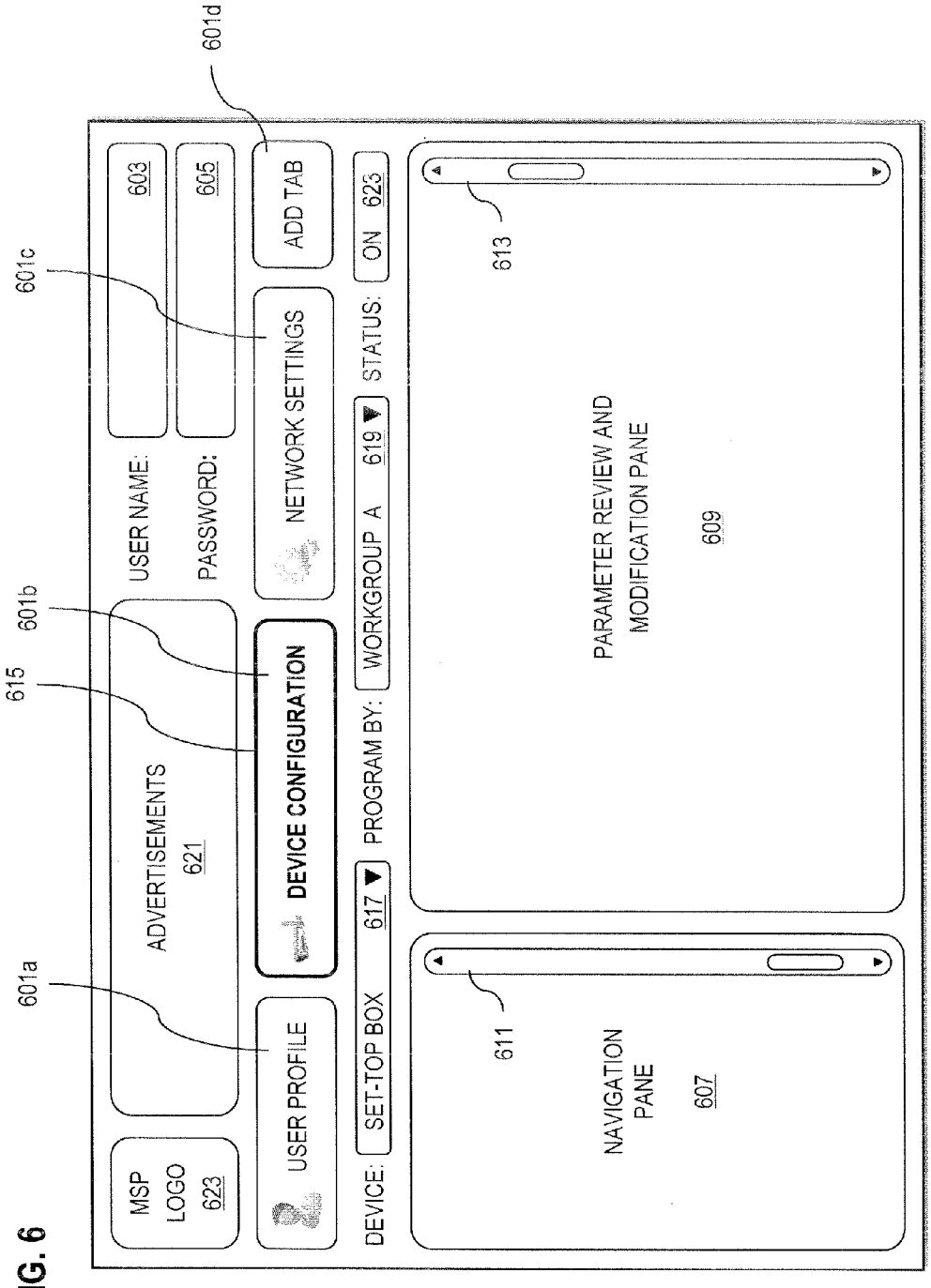

601a
601b
601c
601d
615
MSP LOGO 623
USER PROFILE
ADVERTISEMENTS 621
USER NAME:
PASSWORD:
603
605
DEVICE CONFIGURATION
NETWORK SETTINGS
ADD TAB
DEVICE:
SET-TOP BOX
617
PROGRAM BY:
WORKGROUP A
619
STATUS:
ON 625
611
NAVIGATION PANE
607
613
PARAMETER REVIEW AND MODIFICATION PANE
609

FIG. 6

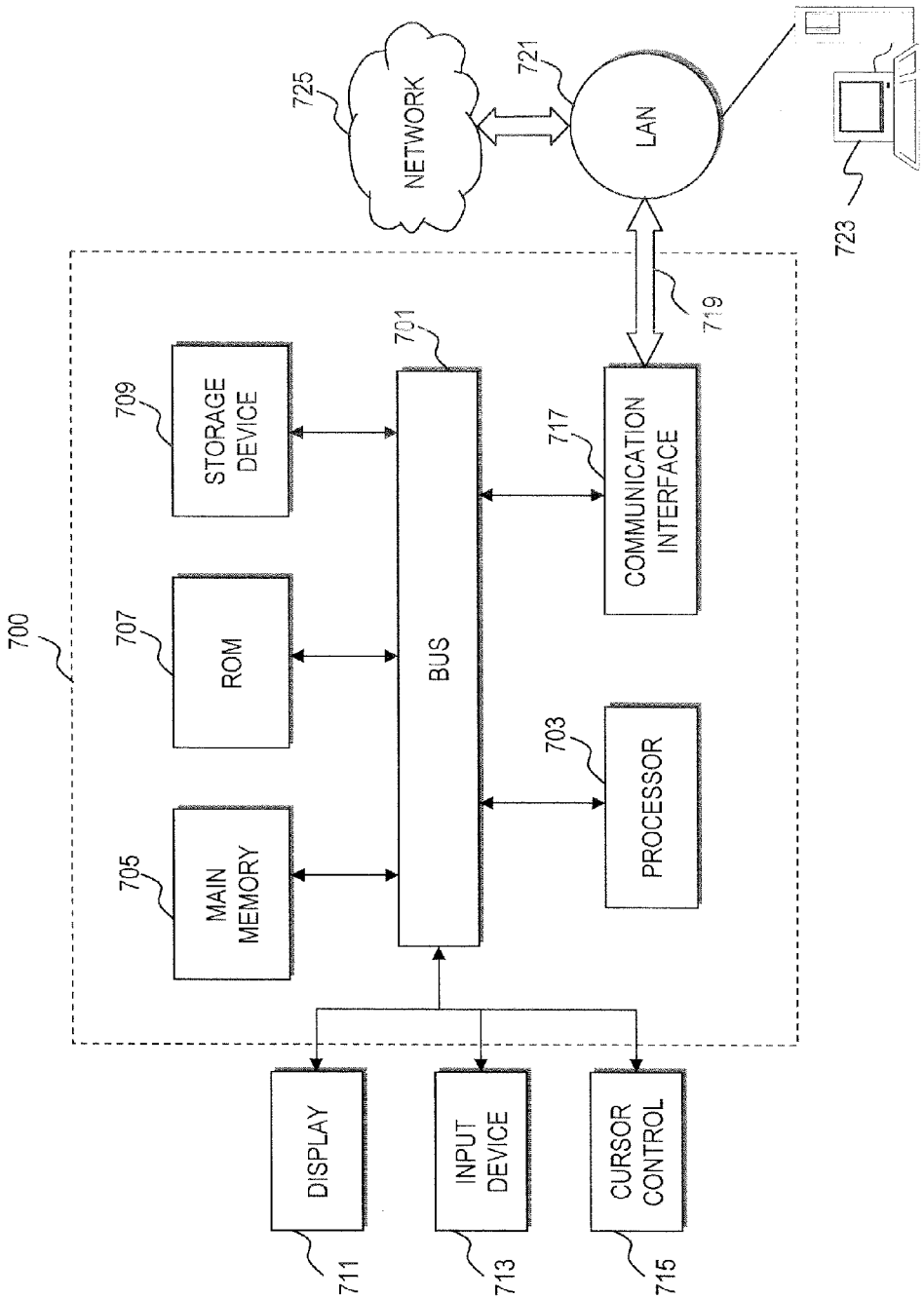

700
MAIN MEMORY
705
ROM
707
STORAGE DEVICE
709
BUS
701
PROCESSOR
703
COMMUNICATION INTERFACE
717
719
LAN
721
NETWORK
725
723
DISPLAY
711
INPUT DEVICE
713
CURSOR CONTROL
715

FIG. 7

METHOD AND APPARATUS FOR REMOTE SET-TOP BOX MANAGEMENT

BACKGROUND INFORMATION

[0001] With the advent of computers, interactive electronic communications, and the Internet, as well as advances in the digital realm of consumer information, has come a reinvention of conventional entertainment and communication services to enhance programming, recording, and viewing of multimedia, such as broadcast television programs. In this manner, service providers are increasing the wealth of available features, not to mention creating endless opportunities for personalized configurations. However, developments in user interface technology have not kept pace with the explosion of digital entertainment, nor have they remained in harmony with the itinerant nature of modern lifestyles. As such, the entertainment value of television is being greatly diminished by antiquated control techniques (namely panel controls or handheld remote controllers), neither satisfying in their design, nor efficient in their implementation.

[0002] Therefore, there is a need for an approach that seamlessly provides efficient, convenient access to system controls and configurations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Various exemplary embodiments are illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings in which like reference numerals refer to similar elements and in which:

[0004] FIG. **1** is a diagram of a system capable of providing remote set-top box management, according to an exemplary embodiment;

[0005] FIG. **2** is a diagram of a set-top box capable of being remotely managed in real-time, according to an exemplary embodiment;

[0006] FIG. **3** is a flowchart of a process for remote management of subscription service settings and configurations, according to an exemplary embodiment;

[0007] FIG. **4** is a diagram of a user interface utilized in the process of FIG. **3**, according to an exemplary embodiment;

[0008] FIGS. **5***a* and **5***b* are flowcharts of processes for remote management of one or more set-top boxes of FIG. **2**, according to exemplary embodiments;

[0009] FIG. **6** is a diagram of a user interface utilized in the processes of FIGS. **5***a* and **5***b*, according to an exemplary embodiment; and

[0010] FIG. **7** is a diagram of a computer system that can be used to implement various exemplary embodiments.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] A preferred apparatus, method, and software for remote services management are described. In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the preferred embodiments of the invention. It is apparent, however, that the preferred embodiments may be practiced without these specific details or with an equivalent arrangement. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the preferred embodiments of the invention.

[0012] Although various exemplary embodiments are described with respect to a set-top box (STB), it is contemplated that these embodiments have applicability to any device capable of processing audio-video (AV) signals for presentation to a user, such as a home communication terminal (HCT), a digital home communication terminal (DHCT), a stand-alone personal video recorder (PVR), a television set, a digital video disc (DVD) player, a video-enabled phone, an AV-enabled personal digital assistant (PDA), and/or a personal computer (PC), as well as other like technologies and customer premises equipment (CPE).

[0013] FIG. **1** is a diagram of a system capable of providing remote set-top box management, according to an exemplary embodiment. For the purposes of illustration, a system **100** for configuring multiple media-based devices **101***a*-**101***n*, e.g., STBs, is described with respect to a service provider network **103**. As used herein, the terms media-based device, STB, and user equipment are interchangeable. It is recognized that service providers need to be mindful of consumer demand for omnipresent control over the entertainment experience. Accordingly, system **100** introduces a remote access management capability for these STBs **101***a*-**101***n*, thereby affording substantial convenience and flexibility in experiencing content by consumers. In other words, the remote access management service of system **100**, according to certain embodiments, stems from the recognition that consumers can benefit from more flexible methods of accessing and controlling one or more media-based devices. However, little attention has been afforded to extending and enhancing user interface technology within the entertainment arena, as well as among other communication mediums. Thus, it is apparent that improvements are needed to provide individuals with the dynamic ability to manage their media experience with easy-to-use tools, but without geographic or time limitations.

[0014] Service provider network **103** includes a server **105** that implements a real-time, remote management service, whereby users can remotely access and configure one or more STBs **101***a*-**101***n* and/or manipulate account settings. Namely, the remote management service provides subscribers ubiquitous control over subscription service parameters (e.g., packages, channels, personal information, available equipment, etc.) and STB configurations (e.g., parental controls, available channels, favorite channels, DVR settings, viewing history, loaded software, etc.) at substantially any moment in time, from various locations. In this manner, a remotely located subscriber, such as an individual at work, can monitor and control content availability, create channel offerings, manipulate recording features, order "on-demand" content, and/or modify personalization options, as well as influence other suitably controllable features of one or more STBs **101***a*-**101***n* located at, for instance, another location, such as their home. It is contemplated that system **100** may embody many forms and include multiple and/or alternative components and facilities.

[0015] It is observed that television remains the prevalent global medium for entertainment and information as individuals spend a great deal of time tuning into televised media. As such, television services provided over a dedicated network, such as an Internet Protocol television (IPTV) network, cable network, or satellite network, extend to subscribers an overwhelming choice of programming options and configurations. For example, IPTV service providers offer consumers various AV services ranging from multi-channel AV programming that mimics traditional broadcast media, to true

"on-demand" programming. These services are further supplemented with interactive AV applications that enable robust programming information, selection and navigation functionality, as well as integrated digital AV recording, and other data services to enhance the AV experience. As such, television is no longer a passive medium; it is an interactive entertainment encounter capable of endless configuration and personalization.

[0016] Traditionally, in order to set-up a media-based device, such as an STB, consumers have been generally limited to directly programming the apparatus using an on-board control panel or manipulating a short-range remote controller in communication with the device. While these conventional techniques may, at times, be suitable for those situations when the user is physically located within the vicinity of the device (e.g., within the same room), they do not address situations when a user is remotely located beyond the short distance confines of the controller's communicative medium, i.e., infrared or radio signal. Furthermore, beyond basic channel surfing and standardized viewing functionality, conventional input methodology does not scale well to the increasing complexity of input commands.

[0017] As mentioned, the consumer segment is driven, at least in part, by a pervasive desire for real-time, remote management services extended through easily manipulated, intuitive interfaces. In part, this is a consequence of consumers becoming accustomed to the user friendliness and remote access ubiquity of the Internet made possible through a combination of wired and wireless infrastructures. Advances in connectivity (e.g., broadband access) and dynamic software have stimulated the growing complexity of services capable of being offered without geographic or time constraints.

[0018] As seen in FIG. **1**, service provider network **103** integrates the television medium with that of the telecommunications, computing, and media environments, thereby broadening the scope of devices available to consumers for remote interaction with STBs **101***a*-**101***n*. In this manner, system **100** relieves STBs users from having to be physically located at (or near) the media-based devices to configure them, by enabling those (or other) users via one or more end terminals (e.g., end terminal **107**) or with an STB (e.g., STB **101***n*), to remotely access and control STBs **101***a*-**101***n* over, for instance, one or more data networks (e.g., packet-based network **109** and/or telephony network **111**). Further, system **100** relieves network operators from the burden and expense of providing parallel avenues to control user equipment (e.g., STBs **101***a*-**101***n*) from remote locations.

[0019] In a typical scenario, an individual (e.g., subscriber of the remote management service) may, via a client-user interface (such as a web-based application **113***a* implemented on server **105**, a computing application **113***b* executed on, for instance, a PC, or a media based application **113***c* operating on, for example, STB **101***n*), access one or more media based devices (e.g., STBs **101***a*-**101***n*) logically associated with one another in, for example, a workgroup **115**, so as to control, configure, or otherwise program STBs **101***a*-**101***n* in real-time from an "online" or "networked" session. Namely, subscribers are presented with an integrated presentation that includes controllable parameters governing information stored on STBs **101***a*-**101***n*, media content originating from a media service provider (MSP) **117** or a third-party source, as well as options relating to subscription services. In other words, an individual may generate a command for controlling a plurality of STBs **101***a*-**101***n*, and transmit that command to the STBs **101***a*-**101***n* to configure the devices **101***a*-**101***n*. As such, subscribers are no longer limited to configuring an STB "from the same room," but instead may access the media-based device, and associated subscription service, from a remote location. In particular embodiments, STBs **101***a*-**101***n* may be associated with one or more subscribers, may be located in one or more user premises (e.g., user premise **119**), and/or may be situated in different physical locations, but nevertheless, can be configured at once, from substantially anywhere, utilizing one or more end terminals **107** (or STBs) having connectivity to system **100**.

[0020] A remote application (e.g., remote application **113***a*) permits users to easily, effectively, and intuitively convey control commands for configuring a plurality of STBs **101***a*-**101***n*, wherein the control commands affect configuration data relating to such parameters as parental controls, available channel information, favorite channels specified by the user, program recording settings, viewing history, and/or software loaded in the respective STBs **101***a*-**101***n*, as well as other suitable control parameters. In certain embodiments, one or more remote applications **113***a*-**113***c* may enable subscribers to manipulate recording functions of one or more STBs **101***a*-**101***n*, wherein a control command specifies a list of content to be recorded by one or more of the devices **101***a*-**101***n*. In other embodiments, a control command can specify an on-demand content selection, such as a video-on-demand (VOD) or audio-on-demand (AOD) selection. In addition, the remote applications **113***a*-**113***n* may enable users to manage subscription services or personalized settings for the STBs **101***a*-**101***n*. Furthermore, the remote applications **113***a*-**113***c* may enable users to make content available at one or more STBs **101***a*-**101***n*, such as content retrieved over a data network, e.g., stored at content repository **121**. As such, embodiments of service provider network **103** may also enable individuals utilizing STBs **101***a*-**101***n* (or end terminal(s) **107**) to interact with one another, through personalized communications channels, to further facilitate the processes described herein.

[0021] Media content can include any AV content (e.g., broadcast television programs, VOD programs, AOD programs, pay-per-view programs, IPTV feeds, DVD related content, etc.), pre-recorded media content, data communication services content (e.g., commercials, advertisements, videos, movies, songs, images, sounds, etc.), Internet services content (streamed audio, video, or pictographic media), and/or any other equivalent media form. In this manner, an MSP **117** may provide (in addition to their own media content) content obtained from sources, such as one or more television broadcast systems **123**, one or more third-party content provider systems **125**, content residing in a repository **121**, accessible via server **105**, or otherwise available via one or more packet-based networks **109** or telephony networks **111**, etc.

[0022] In particular embodiments, MSP **117** may comprise an IPTV system configured to support the transmission of television video programs from the broadcast systems **123** as well as other content, such as media content from the various third-party sources (e.g., **101***a*-**101***n*, **107**, **121**, **125**) utilizing Internet Protocol (IP). That is, the IPTV system **117** may deliver signals and/or streams, including media content and control commands, in the form of IP packets. Further, the transmission network (e.g., service provider network **103**) may optionally support end-to-end data encryption in con-

junction with the streaming and remote management services, as previously mentioned.

[0023] In this manner, the use of IP permits television services to be integrated with broadband Internet services, and thus, share common connections to a user site. Also, IP packets can be more readily manipulated, and therefore, provide users with greater flexibility in terms of control, as well as offer superior methods for increasing the availability of media content. Delivery of AV content and/or control commands, by way of example, may be through a multicast from the IPTV system **117** to the STBs **101***a*-**101***n*. Any individual STB may tune to a particular source by simply joining a multicast (or unicast) of the media content or control command, utilizing an IP group membership protocol (IGMP). For instance, the IGMP v2 protocol may be employed for joining STBs to new multicast (or unicast) groups. Such a manner of delivery avoids the need for expensive tuners to view media content, such as television broadcasts; however, other delivery methods, such as directly modulated carriers (e.g., national television systems committee (NTSC), advanced television systems committee (ATSC), quadrature amplitude modulation (QAM)), may still be utilized. Further, this delivery method also enables varied levels of control, i.e., control over single STBs or broadcast control commands affecting multiple STBs. It is noted that conventional delivery methods may also be implemented and combined with the advanced methods of system **100**. Further, the media content (and subsequently the control commands) may be provided to various IP-enabled devices, such as the computing, telephony, and mobile apparatuses delineated below.

[0024] An STB (e.g., STB **101***a*) may integrate all the functions of an IPTV system, as well as combine the media content and control functions of the various online or off-line environments, in a manner that seamlessly toggles among the various system **100** resources. It is contemplated that the remote service may be extended to users with a presence on the Internet. In alternative embodiments, the services of system **100** could be extended to users having an end terminal (not illustrated), such as a plain old telephone service (POTS) device, connected to the telephony network **111**.

[0025] Accordingly, MSP **117** can provide media content that is retrieved over a data network, as well as provide conventional media streams. For instance, MSP **117** provides STBs **101***a*-**101***n* access to content traditionally limited to host sites, such as end user originated content uploaded to audio, video, and/or pictographic sharing sites. The media content may also be shared between STBs **101***a*-**101***n*, as well as between STBs **101***a*-**101***n* and end terminal(s) **107**. It is generally noted that media content can be any type of information provided from any source having connectivity to system **100**.

[0026] In this manner, remote applications **113***b* and **113***c* may be executable, for example, as a user interface capable of local implementation on an STB (e.g., STB **101***a*-**101***n*) or on an end terminal **107**, such as a computer, telephony device, mobile device, or other like mechanism. Thus, exemplary embodiments of remote applications **113***a* and **113***b* may be provided through navigation shell applications, e.g., menu applications having options corresponding to different functions. Accordingly, computer devices may include desktop computers, notebook computers, servers, terminal workstations, gaming systems, customized hardware, or other equivalent apparatus. Telephony devices may comprise plain-old-telephones, wireless telephones, cellular telephones, satellite telephones, voice over internet protocol telephones, and the like. Mobile devices may include personal digital assistants (PDA), pocket personal computers, smart phones, tablets, handsets, portable gaming systems, and customized hardware, as well as other mobile technologies capable transmitting data. Moreover, STBs **101***a*-**101***n* may be used alone or in combination with one or more end terminal(s) **107** to implement various exemplary embodiments.

[0027] The STBs **101***a*-**101***n* and/or end terminal(s) **107** can communicate using the packet-based network **109** and/or the telephony network **109**. These systems can include: a public data network (e.g., the Internet), various intranets, local area networks (LAN), wide area networks (WAN), the public switched telephony network (PSTN), integrated services digital networks (ISDN), other private packet switched networks or telephony networks, as well as any additional equivalent system or combination thereof. These networks may employ various access technologies including cable networks, satellite networks, subscriber television networks, digital subscriber line (DSL) networks, optical fiber networks, hybrid fiber-coax networks, worldwide interoperability for microwave access (WiMAX) networks, wireless fidelity (WiFi) networks, other wireless networks (e.g., 3G wireless broadband networks, mobile television networks, radio networks, etc.), terrestrial broadcasting networks, provider specific networks (e.g., a Verizon® FiOS network, a TiVo network, etc), and the like. Such networks may also utilize any suitable protocol supportive of data communications, e.g., transmission control protocol (TCP), internet protocol (IP), user datagram protocol (UDP), hypertext markup language (HTML), dynamic HTML (DHTML), file transfer protocol (FTP), telnet, hypertext transfer protocol (HTTP), asynchronous transfer mode (ATM), wireless application protocol (WAP), socket connection (e.g., secure sockets layer (SSL)), Ethernet, frame relay, and the like, to connect STBs **101***a*-**101***n* to various sources of media content and devices capable of remotely managing STBs **101***a*-**101***n*.

[0028] Although depicted in FIG. **1** as separate networks, packet-based network **109** and/or telephony network **111** may be completely or partially contained within service provider network **103**. For example, service provider network **103** may include facilities to provide for transport of packet-based and/or telephony communications.

[0029] By way of example, STB **101***a*-**101***n*, as well as terminal(s) **107**, can remotely access, via a communication interface (not illustrated), server **105** which is configured to execute multiple instances of a remote application **113***a* utilizing, for instance, one or more processors (not illustrated). That is, remote application **113***a* may be provided in a distributed fashion using, for instance, client-server architectures, such as implemented by enterprise application service providers (ASP). It is noted that ASP models (and other like architectures) offer system scalability in terms of administrative scalability, geographic scalability, and/or load scalability. Thus, distributed environments are attractive modes for disseminating system **100** functionality to a broad spectrum of users and devices.

[0030] For example, server **105** can be an "online" system capable of communicating with one or more third-party web servers (not illustrated), content repositories (e.g., repository **121**), or equivalent facilities, to provide users various avenues to draw media content from, as well as control and configure STBs **101***a*-**101***n* (or subscription services) from a remote location having connectivity to system **100**. More specifi-

cally, one or more servers **105** may include one or more processors configured to receive one or more commands from one or more end terminals **107** (e.g., a PC) for controlling one or more STBs **101***a*-**101***n*, wherein the server(s), via the processor(s), are capable of configuring the STB(s) **101***a*-**101***n* according to the received command(s). In particular embodiments, this configuration can be performed in real-time, wherein commands transmitted to STBs **101***a*-**101***n* directly effect configuration data stored in a memory of the respective media-based devices **101***a*-**101***n*. Additionally (or alternatively), server(s) **105** can access a shared memory, such as repository **127**, wherein STBs **101***a*-**101***n* obtain configuration data from the shared memory, either in real-time or periodically.

[0031] As such, exemplary embodiments of remote application **113***a* may, for instance, comprise hypertext markup language (HTML) user interfaces or JAVA™ applets stored on server **105** and accessed via world-wide-web pages. Further, by enabling access and control of STBs **101***a*-**101***n* over one or more data networks (e.g., network **103**, **109**, or **111**) using a "web paradigm," server **105** provides users with a convenient and efficient manner for configuring the devices **101***a*-**101***n*. Further, remote applications **113***a*-**113***c* may port local control interfaces typically utilized on stand-alone STBs to enable control input in a context consumers are increasing becoming familiar with due to the growing popularity of the Internet. These interlaces are particularly useful in extending system **100** functionality to devices having limited resources (e.g., PDAs, handsets, thin-clients, etc.), as well as providing scalable solutions to varied devices without necessitating intensive high-end costs associated with independent design, tooling, and manufacturing. In alternative embodiments, server **105** is collocated with and/or integrated into MSP **117**. As such, multiple users, interfaces, and instances of remote application **113***a* can be simultaneously realized through system **100**.

[0032] In one embodiment, STBs **101***a*-**101***n*, end terminal (s) **107**, and/or remote applications **113***a*-**113***c* may periodically establish a connection with one or more networks (e.g., networks **103**, **109**, or **111**) and/or one or more repositories (e.g., repository **127**) to "push" and "pull" control commands and configuration information, such as in a "batched" processing mode. That is, a user interface of STBs **101***a*-**101***n* may be virtualized over a networked connection. In another embodiment, these components may initiate peer-to-peer communications such that control input and configuration updates governing the STBs **101***a*-**101***n* are executed "on-the-fly," i.e., in real-time, thus, enabling substantially instantaneous results.

[0033] In the example of FIG. **1**, STBs **101***a*-**101***n* are located at one or more user premises (e.g., user premise **119**), and geospatially associated with one or more regions. Further, the STBs **101***a*-**101***n* are logically associated into one or more workgroups (e.g., workgroup **115**), wherein a user may configure a plurality of STBs **101***a*-**101***n* arranged into the workgroup **115** in one or more sessions, from substantially anywhere, utilizing one or more end terminals **107** or STBs (e.g., STB **101***n*).

[0034] For example, a learning institution (such as a secondary school) can distribute a plurality of STBs (e.g., STBs **101***a* and **101***b*) throughout various classrooms for extending media content to an attending student body. An administrator (e.g., a principal) may control and configure the plurality of STBs, via an end terminal **107** (e.g., a PC in the principal's office) or at an associated STB (e.g., STB **101***b*) executing a remote application (e.g., remote applications **113***a*-**113***c*), so as to select and disseminate educational programming (e.g., a VOD documentary on social awareness) to the students, in real-time. Further, students maybe issued (or personally own) an STB at their home, e.g., STB **101***n*. As such, an authorized administrator can logically join STBs **101***a*-**101***n* to workgroup **115**, wherein the plurality of STBs **101***a*-**101***n* may be controlled and configured to present the educational programming to an entire student body. In other words, if certain students were unable to attend school on presentation day, the administrator could simultaneously configure STBs **101***a*-**101***n* to present the media content so that no student would be deprived of a learning opportunity. If, for instance, the documentary was a live-broadcast extending beyond an allocated time period, the administrator may, via remote application (e.g., remote applications **113***a*-**113***c*), command one or more STBs (e.g., STB **101***b*) to record the content for later sessions. In this manner, the administrator may also provide on-demand access to the programming (or recording), wherein certain students may be given authorization to review the material later, via STBs **101***a*-**101***n* or an end terminal **107** capable of processing audio and/or video signals. As such, STBs **101***a*-**101***n* may be associated with one or more subscribers, may be located in one or more user premises **119**, and/or may be situated in different physical locations, but nevertheless, may be configured as an entity, from substantially anywhere, utilizing one or more end terminals **107** (or STBs **101***a*-**101***n*) having connectivity to system **100**.

[0035] Thus, STBs **101***a*-**101***n* can be configured to communicate with and receive signals and/or data streams from a MSP **117** (or other transmission facility, such as server **105**) in response to processes of one or more remote applications **113***a*-**113***c*. These signals include media content and conventional AV-broadcast content, as well as control commands transmitted over a data network (e.g., service provider network **103**, packet-based network **109**, and/or telephony network **111**). To this effect, MSP **117** can include one or more media content servers (not illustrated) and/or data repositories (not shown). Alternatively, user profile repository **127**, content repository **121**, or server **105** may be accessed via one or more service provider networks **103** and/or packet-based networks **109**. Further, service provider network **103** may include a system administrator (not shown) for operational and management functions to deploy the remote management service using, for instance, an IPTV system. In this manner, STBs **101***a*-**101***n* can utilize any suitable technology to draw, receive, and/or transmit media content and control signals from/to an MSP **117** or other source/sink (e.g., server **105**). A more detailed explanation or an exemplary STB is provided with respect to FIG. **2**.

[0036] In an exemplary embodiment, STBs **101***a*-**101***m* can draw, receive, and/or transmit content and control commands from (or to) multiple sources/sinks, thereby alleviating the burden on any single entity, e.g., MSP **117**, to meet the content and control demands of any user or premise. Thus, particular embodiments enable authenticated third-party television broadcast systems **123**, third-party content provider systems **125**, and servers (e.g., server **105**) to transmit media content and/or control commands to STBs **101***a*-**101***n* either apart from, or in conjunction with, MSP **117**. The media content and/or the control commands may be distinguished (or otherwise categorized) utilizing metadata included therewith or appended thereto. Metadata can be generally consid-

ered data about data; but more specifically, it can be utilized to describe all aspects of, and media content or control command distributed by, system **100**. Namely, metadata can include descriptions about: data aspects (file name, type, administrator, size, location, version, or include timestamps, mode bits, arbitrary attribute-value pairs, etc.), titles, activities/events, individuals and organizations involved, intended audiences (e.g., ethnicities, ages, genders, incomes, educational levels, disabilities, mobilities, as well as other like demographic statistics), geospatial identifications (intended zip codes, school districts, communities, etc.), locations of supplementary information and processes, access methods, limitations, timing of activities/events (e.g., start/end dates), as well as motivations, policies and rules. As such, metadata may be utilized by various components of system **100** for control or guiding purposes.

[0037] In certain embodiments, system **100** may structure and encode metadata to describe characteristics of the content-bearing entities to aid in the identification, discovery, assessment, and management of the media content by remote applications **113***a*-**113***c*. For example, the metadata can be used to optimize compression algorithms or perform other computational tasks by the components of system **100**. The metadata might be utilized to generate and/or transmit control commands to a plurality of STBs **101***a*-**101***n*. Various other embodiments might use metadata to suggest media content sources of interest to a user based on information stored in a user profile. In still further embodiments, metadata can be utilized to describe control parameters governing STBs **101***a*-**101***n* and or subscription services. A more detailed explanation of user profiles is provided with respect to FIG. **2**.

[0038] In various embodiments, the service provider network **103** may include one or more video and/or audio, as well as control command, processing modules (not shown) for acquiring, generating, and/or transmitting content feeds and/or control commands from MSP **117**, the television broadcast systems **123**, the third-party content provider systems **125**, servers **105**, end terminals **107**, or STBs **101***a*-**101***n*, over one or more of the networks **103**, **109**, **111**, to particular STBs **101***a*-**101***n*. Accordingly, service provider network **103** may include facilities to support compression/decompression, coding/decoding, modulation/demodulation, optical/electrical conversion, and analog/digital conversion, as well as any other suitable signal processing and/or transmission operation. Further, service provider network **103** can optionally support end-to-end data encryption in conjunction with media content streaming and remote access services such that only authorized users are able to experience content, remotely control one or more STBs, and/or interact with other legitimate users/components of system **100**.

[0039] Accordingly, system **100** may include an authentication module (not shown) configured to perform authorization/authentication services and determine whether users are indeed subscribers to the remote management service. An authentication schema may require a user name and password, a key access number, a unique machine identifier (e.g., media access control (MAC) address), etc., as well as a combination thereof. Once a subscriber has authenticated a presence on system **100**, the user may bypass additional authentication procedures for executing later applications (e.g., media content streaming instances and/or control command sessions). Data packets, such as cookies, may be utilized for this purpose. Thus, once an STB or content source is authenticated, connections between the STBs **101***a*-**101***n* and the end terminal(s) **107** may be established directly or through server **105** and/or MSP **117**.

[0040] In other embodiments, authentication procedures on a first device (e.g., STB **101***a*) may identify and authenticate a second device (e.g., terminal **107**) and/or third device (STB **101***b*-**101***n*) communicatively coupled to, or associated with, the first device. Further, the authentication module may grant users the right to control one or more STBs serviced by service provider network **103** by revoking existing sets of digital certificates associated with a STB/end terminal, and issuing new sets of digital certificates mapped to a second STB/end terminal. In this regard, subscribers may start a new control sessions, whereas the previous session may be automatically closed when the "old" or prior certificates associated with the first session are revoked. This enables users to initiate secure sessions at any given end terminal **107** (or STB **101***a*-**101***n*) linked to system **100**, whether or not the end terminal (or STB) belongs to that individual user. It is additionally contemplated that multiple rights sessions may exist concurrently.

[0041] While system **100** is illustrated in FIG. **1**, the exemplary components are not intended to be limiting, and indeed, additional or alternative components and/or implementations may be utilized.

[0042] FIG. **2** is a diagram of a set-top box capable of being remotely managed in real-time, according to an exemplary embodiment. STB **201** may comprise any suitable technology to receive one or more control commands (e.g., signals **203***a* and **203***b*) from a sever **205** and/or an end terminal **207**, as well as from another STB (e.g., STB **101***n*). As such, STB **201** can generate a command for controlling a plurality of STBs (e.g., STBs **101***a*-**101***n*) and can transmit the command to STBs **101***a*-**101***n* for configuring the devices. The control commands include output from one or more remote applications **209***a*-**209***c* for configuring a plurality of STBs, wherein the configuration may be performed "on-the-fly," i.e., in real-time, or as the result of a "batched" request, i.e., periodically. STB **201** may further comprise suitable technology to receive one or more content streams **211** from a media source **213**, such as the IPTV system of FIG. **1**. The content stream **211** may be received in response to command(s) from remote application(s) **209***a*-**209***c*.

[0043] Accordingly STB **201** may comprise computing hardware (such as described with respect to FIG. **7**) and include additional components configured to provide specialized services related to the generation, transmission, reception, and display of control commands and media content (e.g., remote control capabilities, conditional access functions, tuning functions, presentation functions, multiple network interfaces, AV signal ports, etc.). Alternatively, the functions and operations of STB **201** may be governed by a controller **215** that interacts with each of the STB components to configure STB **201** in response to control commands from remote applications **209***a*-**209***c*, as well as provide media content retrieved from media source **213**. Additionally, a user may be afforded conventional control capabilities utilizing a control device **217**.

[0044] As such, SIB **201** may be configured to process data streams (e.g., streams **203***a*, **203***b*, and **211**), including causing a remote application **209***c* and/or one or more components of received media content (e.g., video component **219** and/or an audio component) to be presented on (or at) display **221**. Presentation of the media content may be in response to a

command received from one or more remote applications **209***a*-**209***c* and include: displaying, recording, playing, rewinding, forwarding, toggling, selecting, zooming, or any other processing technique that enables users to experience media content. For instance, STB **201** may provide one or more signals **223** to a display **221** (e.g., television) so that the display **223** may present (e.g., display) remote application **209***c* overlaid on the media content (e.g., video **219**) to a user, wherein the remote application **209***c* enables users to generate and transmit a command for controlling and/or configuring a plurality of STBs (e.g., STBs **101***a*-**101***n*). Alternatively, signals **223** may be configured and provided to display **221** in response to a received control command from a remote application(s) **209***a*-**209***c*.

[0045] STB **201** may also interact with a PVR, such as digital video recorder (DVR) **225**, to store received media content that can then be manipulated by a user at a later point in time. In various embodiments, DVR **225** may be network-based, e.g., included as a part of the service provider network **103**, collocated at a subscriber site having connectivity to STB **201** and/or integrated into STB **201**. In any case, remote applications **209***a*-**209***c* may port control interfaces provided by DVR **225** to enable further user controllability, such as providing recording functions specifying a list of content to be recorded by DVR **225** and/or STB **201**. A display **221** may present content provided via STB **201** to a user. In alternative embodiments, STB **201** may be configured to communicate with a number of additional peripheral devices, including: PCs, laptops, PDAs, cellular phones, monitors, mobile devices, handheld devices, as well as any other equivalent technology capable of presenting content to a user, such as those computing, telephony, and mobile apparatuses described with respect to FIG. **1**.

[0046] These peripherals may be configured to access content stored and/or processed by STB **201** in response to control commands from remote applications **209***a*-**209***c*. For example, a media content stream **211** may be received by STB **201** and recorded by DVR **225** as the result of a received command from remote application **209***a*, wherein a PC may later access and view the stored content. Moreover, the peripheral devices may be configured to implement instances of a remote application (e.g., remote application **209***b*) to control, configure or otherwise program the options and/or functions of STB **201**. For instance, a remote application **209***b* executed on end terminal **207** may receive input from a user specifying VOD content to make available via STB **201**. An associated control command, generated based on the input, may be received at communication interface **227**, wherein STB **201** retrieves the VOD content for presentation to the user via display **221**. In another embodiment, a communication interface (not illustrated) of end terminal **207** may be configured to retrieve the VOD content over, for instance, a data network (e.g., packet-based network **105**), wherein STB **201** may receive a data stream **203***b* from end terminal **207** including the retrieved content and a control command(s) to present the media content to the user via display **221**.

[0047] In another embodiment, user input to STB **201** and/or a peripheral device (e.g., end terminal **207**) executing an instance of a remote application (e.g., remote application **209***c* and/or **209***b*) may cause specified media content (e.g., a VOD program) to be made available at another STB (e.g., STB **101***a*-**101***n*) or a computing, telephony, or mobile device capable of processing audio and/or video streams, Still further, user input to a network-based remote application **209***a*, implemented on, for instance, server **205**, may be configured to program or otherwise control the options and/or functions of STB **201**. For instance, a user may access remote application **209***a* via an end terminal **107**, over one or more data networks (e.g., network **103**, **109**, and/or **111**), to transmit commands to configure STB **201** such that a list of content (e.g., live programming) may be recorded by STB **201** and/or DVR **225**. In this manner, server **205** (or other component of system **100**, such as MSP **117**) may, when suitable, transmit the specified media content as a part of stream **203***a* to STB **201** for presentation at display **221**.

[0048] Communication interface **227** may be configured to receive control commands from server **205**, end terminal **207**, MSP **117**, or another STB (e.g., STB **101***a*). In turn, content streams from a media source **213** (e.g., MSP **117**, television broadcast system **123**, content provider system **125**, and/or repository **121**), an end terminal **207**, and/or server **205** may also be received at communication interface **227**. In particular embodiments, communication interface **227** may optionally include single or multiple port interfaces. For example, STB **201** may establish a broadband connection to multiple sources transmitting data to STB **201** via a single port, whereas in alternative embodiments, multiple ports may be assigned to the one or more sources. In still other embodiments, communication interface **227** may transmit control commands so as to configure a plurality of STBs **101***a*-**101***n*. Further, communication interface **227** may be configured to permit users, via STB **201**, to transmit other data (e.g., media content, communications, etc.) to other users with STBs, an MSP **117**, or any other suitable source/sink, such as end terminal **207**.

[0049] According to various embodiments, STB **201** may also include inputs/outputs (e.g., connectors **229**) to display **221** and DVR **225**, as well as an audio system **231**. In particular, audio system **231** may comprise a conventional AV receiver capable of monaural or stereo sound, as well as multichannel surround sound. Audio system **231** may include speakers, ear buds, headphones, or any other suitable component configured for personal or public dissemination. As such, STB **201**, display **221**, DVR **225**, and audio system **231**, for example, may support high resolution audio and/or video streams, such as high definition television (HDTV) or digital theater systems high definition (DTS-HD) audio. Thus, STB **201** may be configured to encapsulate data into a proper format with required credentials before transmitting onto one or more of the networks of FIG. **1** and de-encapsulate incoming traffic to dispatch data to display **221** and/or audio system **231**.

[0050] In an exemplary embodiment, display **221** and/or audio system **231** may be configured with IP capability (i.e., include an IP stack, or otherwise made network addressable), such that the functions of STB **201** may be assumed by display **221** and/or audio system **231** and control/configured by remote application(s) **209***a*-**209***c*. In this manner, an IP ready, HDTV display or DTS-HD audio system may be directly connected to one or more service provider networks **103**, packet-based networks **109**, and/or telephony networks **111**. Although STB **201**, display **221**, DVR **225**, and audio system **231** are shown separately, it is contemplated that these components may be integrated into a single component, or other combination of components.

[0051] An authentication module **233** may be provided at STB **201** to initiate or respond to authentication schemes of, for instance, service provider network **103** or various other

content providers, e.g., broadcast television systems **123**, third-party content provider systems **125**, or servers **105**. Authentication module **233** may provide sufficient authentication information, e.g., a user name and password, a key access number, a unique machine identifier (e.g., MAC address), and the like, as well as combinations thereof, to a corresponding network interface for establishing connectivity. As described earlier, one or more digital certificates may be simultaneously mapped. Moreover, authentication at STB **201** may identify and authenticate a second device (e.g., end terminal **207**) communicatively coupled to, or associated with, STB **201**, or vice versa. Further, authentication information may be stored locally at memory **235**, in a repository (not shown) connected to STB **201**, or at a remote repository, e.g., user profile repository **127**.

[0052] Authentication module **233** may also facilitate the reception of data from single or disparate sources. For instance, STB **201** may receive broadcast video from a first source (e.g., IPTV system **117**), signals from a remote application at second source (e.g., server **105**), and a media content stream from a third source accessible over a data network (e.g., content repository **121**). As such, display **221** may present the broadcast video, remote application, and media content stream to the user, wherein STB **201** (in conjunction with one or more remote application(s) **205***a*-**205***c*) can permit users to control and configure STB **201**, as well as experience various sources of media content available via system **100**. This presentation may be experienced separately, concurrently, in a toggled fashion, or with zooming, maximizing, minimizing, or trick capabilities, or equivalent mode. In other exemplary embodiments, authentication module **233** can authenticate a user to allow them to control and configure other STBs (e.g., STB **103***a*-**103***n*) and/or subscription services.

[0053] A presentation module **237** may be configured to receive data streams **203***a*, **203***b*, and-**211** (e.g., AV feed(s) and/or control commands) and output a result via one or more connectors **229** to display **221** and/or audio system **231**. In this manner, presentation module **237** may also provide a user interface for remote application **209***c* via display **221**. Aural aspects of remote application **209***c* may be presented via audio system **231** and/or display **221**. In certain embodiments, remote application **209***c* may be overlaid on the video content output **219** of display **221** via presentation module **237**. In any case, however, the data streams may include content received in response to user commands specifying: broadcast channels to be made available, a list of media content to be recorded, an on-demand program (e.g., VOD, AOD, etc.) to be received, or other content available over a data network to be retrieved, such as content from an audio and/or video sharing site.

[0054] Connector(s) **229** may provide various physical interfaces to display **221**, audio system **231**, as well as other peripherals; the physical interfaces may include, for example, RJ45, RJ11, high definition multimedia interface (HDMI), optical, coax, FireWire, wireless, and universal serial bus (USB), or any other suitable connector. The presentation module **237** may also interact with a conventional control device **217** for determining particular media content that a user desires to experience. In an exemplary embodiment, the control device **217** may comprise a remote control (or other access device having control capability, such as end terminal **207**, e.g., a PC, wireless device, mobile phone, etc.) that provides a user with the ability to readily manipulate and dynamically change parameters affecting a media content experience. Such parameters can include configuration data, such as parental controls, available channel information, favorite channels specified by the user, program recording settings, viewing history, or loaded software, as well as other suitable control parameters.

[0055] In particular embodiments, configuration data may also include channel fixing options, show/hide/label channel functions, making captions or info banners available, label inputs (such as connector(s) **229**) options, application graphics settings (e.g., color schemes, icons, etc.), high altitude settings, power saving modes, device password options, country/language options, display settings (e.g., AV parameters), conventional control functions (e.g., channel up/down, input, mute, pause, picture-in-picture, play, power on/off, rewind, fast-forward, record, stop, volume up/down), parental locks, application settings (e.g., memory sticks, i.links, clocks/timers, diagnostics, cable card), change operating system functions, or install software, as well as provide troubleshooting frequently asked questions, get device manuals, or receive safety tips, etc. It is generally noted that configuration data can be any option/feature available at STB **201**, DVR **225**, or peripheral device (e.g., display **221**, audio system **231**, control device **217**, etc.) having connectivity to (or association with) STB **201**.

[0056] In this manner, control device **217** and/or end terminal **207** may include (not shown) a cursor controller, trackball, touch screen, touch pad, keyboard, and/or a key pad for activating remote manager applications **209***a*-**209***c*, navigating through broadcast channels and/or media content, as well as performing other control functions and configurations. For instance, control device **217** or end terminal **207** may be utilized to maximize a remote application, navigate through displayable interfaces, locate/specify/retrieve media content, modify STB **201** configuration data, or toggle through broadcast channels and/or available media content. Control device **217** or end terminal **207** may also include functional actuators (e.g., buttons, keys, icons, etc.), such as power on/of, play, pause, stop, fast-forward, reverse, volume up/down, channel up/down, menu, ok/enter, record, info, my content, search, edit, or exit, as well as any other suitable control trigger, such as alphanumeric buttons, shift, control, back, symbols, and the like. In other examples, STB **201** may be configured for voice recognition such that STB **201** may be controlled with spoken utterances entered into a remote application.

[0057] Further, the control device **217** or end terminal **207** may comprise a memory (not illustrated) for storing preferences (or configuration data) affecting the media content viewed, which can be conveyed to STB **201** through an input interface **239** (or communication interface **227**). Input interface **239** may support any type of wired and/or wireless link, e.g., infrared, radio frequency (RF), BLUETOOTH, and the like. Thus, control device **217** and/or end terminal **207** may store user preferences with respect to media content, such as favorite sources, etc., as well as configuration data. Alternatively, user preferences and configuration data may be tracked, recorded, or stored in STB **201**, via memory **235**, or in a network user profile repository **127**. The preferences and configuration data may be automatically retrieved and activated by a user at any time, or may be actuated in response to control commands received via remote applications **209***a*-**209***c*. It is noted that control device **217** may be separate from

STB **201** or may be integrated within STB **201** (in which case certain input interface hardware and/or software may not be necessary).

[0058] Particular embodiments enable users, via one or more remote applications **209***a*-**209***c* and control device **217**, to populate or otherwise configure a user profile or manage subscription service options. For instance, a user profile function of a remote application(s) **209***a*-**209***c* may be provided or accessed by STB **201**/end terminal **207** to enable users to populate a plurality of entry fields with user information. A user profile may include one or more customized or personalized settings that affect any aspect of media content accessible via STB **201**, configuration parameter of STB **201**, or option of a peripheral device. More specifically, the profile may include: subscription information (account number, user name, password, security question, avatar, moniker, etc.), subscriber demographics (age, gender, ethnicity, location of residence, zip code, school district, community, socioeconomic status, religion, marital status, ownerships, languages, mobility, life cycles, etc.), group/organizational affiliations (e.g., political), memberships, interests, buddies, friends, cohorts, system configurations, policies, associated users/devices, etc., as well as any other like personal information.

[0059] In other embodiments, profile information can include phone numbers, email addresses, workgroups, viewing history (e.g., current programming, logged history, etc.) account plan, authorized access, billing preferences (e.g., bill receipt options, such as electronic or paper bills, payment methods, such as automatic or manual, etc.), add accounts/users, parental controls, etc. Additionally, a user profile may include a "whitelist" specifying one or more accessible media content sources/subjects, a "blacklist" specifying one or more media content sources/subjects, as well as other equivalent customized settings, such as color schemes, sound effects, etc. Still further, network settings may be affected such as registering associated STBs, DVRs, end terminals, registering premises (e.g., primary residence, vacation cottage, work, etc.), link to content sources (e.g., audio, video, and/or pictographic sites/systems/repositories, etc.), as well as other equivalent parameters.

[0060] In other embodiments, the user profile and configuration data may be established, reviewed, and/or modified using the additional access devices described earlier, e.g., end terminal **207**, such as a PC, implementing or accessing one or more remote applications **209***a*-**209***c*. As such, user profile information and configuration data may be stored in STB **201**, e.g., in memory **235**, and/or at a user site repository (not illustrated) directly connected to STB **201**. Additionally or alternatively, this information may be stored in a network-based repository (e.g., remote user profile repository **127**), control device **217**, and/or any other accessible storage medium, such as a memory stick. Similarly, STB **201** (via memory **235**), a user site repository, and/or a network-based repository may store a collection of digital audio, video and/or pictographic content accumulated by a user. This collection may also include a plurality of identifiers (or bookmarks) to media content established via remote application(s) **209***a*-**209***c*, wherein the selection of a particular identifier may cause the content to be retrieved from an associated link (either directly from a third party source (e.g., television broadcast system **123**, content provider system **125**, content repository **121**, etc.) or indirectly from server **105**, MSP **117**, end terminal **107**, another STB **101***a*-**101***n*, etc.).

[0061] Thus, under arrangements of FIGS. **1** and **2**, a user may, in real-time, remotely control and/or configure one or more STBs (e.g., STBs **101***a*-**101***n*), as well as establish and/or modify a user profile or other subscription service, from any location have connectivity to system **100**, via an STB (e.g., **101***n*), end terminal **107**, or server **105** application, at any given point in time. The operation of STB **201** and one or more remote applications **209***a*-**209***c*, in conjunction with the components of system **100**, will now be described with respect to remotely controlling and configuring one or more STBs and one or more subscription service options.

[0062] As there may be a relatively large number of configurable parameters available to users, STB **201** may include one or more user interfaces configured to allow subscribers to seamlessly access the configurations and control parameters of one or more STBs **101***a*-**101***n* and/or related subscription service options, via one or more remote applications **209***a*-**209***c*. As such, media content may be made available to STBs **101***a*-**101***n* via the remote applications **209***a*-**209***c*. It is recognized; however, that one or more user interfaces may be implemented at one or more end terminals **207** or accessible via one or more servers **205** or MSPs **117**. Thus, the user interface may be displayed to the user as part of a remote application accessed over a suitable communications link. Namely, web pages may be displayed to the user as part of an online remote application accessed over an Internet communications link. Exemplary processes and user interfaces for those processes are described in more detail with respect to FIGS. **3**-**6**.

[0063] FIG. **3** is a flowchart of a process for remote management of subscription service settings and configurations, according to an exemplary embodiment. This process is described with respect to an exemplary user interface of FIG. **4**. In step **301**, a new user subscribes to the remote management service utilizing, for instance, an end terminal **207**, which is capable of processing and transmitting data over a network (e.g., packet-based network **109**). That is, the user may interact with an input interface of end terminal **207** to activate software resident on the device, such as remote application **209***b*, or web-based remote application **209***a* implemented on server **205**. The software may then establish one or more connections to a service provider network **103** through an IP-based connection. Consequently, the user may register as a new subscriber of the remote management service, as well as obtain sufficient authentication information for establishing future sessions.

[0064] In certain embodiments, registration procedures may prompt the user to identify all user devices (e.g., STBs **101***a*-**101***n* and/or end terminal(s) **107**) that the user may employ to interact with system **100** features, e.g., remote applications **209***a*-**209***c*. The software may automatically search for peripheral devices, e.g. through a pinging or other suitable procedure, as well as port any peripheral configuration parameters or user interface into, for instance, user profile repository **127** for access by remote applications **209***a*-**209***c*. In other embodiments, the user may identify devices by entering appropriate device information, such as: device type, serial number, registration number, MAC address, phone number, communications link, etc. As such, MSP **117**, server **105**, and or one or more remote applications **209***a*-**209***c* may obtain configuration parameters and user interface information from a manufacturer or other third-party supplier over, for instance, the packet-based network **109**. Further, when a new device is employed, the software may add the apparatus

to the list of user devices associated with the user's account. To this effect, registered devices (such as one or more STBs **101***a*-**101***n*) may be logically associated with one another. That is, STBs **101***a*-**101***n* can be grouped into workgroups for controlling a plurality of STBs **101***a*-**101***n* or associated subscription service options governing the devices and/or services (e.g., available media content).

[0065] Once registered and/or authenticated, end terminal **207**, via remote application **209***a* or **209***b*, may establish communication with MSP **117** for customizing a user profile to embody user-defined attributes, policies, configuration data, premises, and/or workgroups for carrying out functions of system **100**. Thus, when the user authenticates a presence via, for instance, an STB **201**, the software may provide user-specific interfaces and features based on information stored within the user profile. Moreover, authentication procedures at one device (e.g., end terminal **107**) may authenticate other devices (e.g., STBs **101***a*-**101***n*), as previously described, or vice versa. In other embodiments, users may subscribe to the remote management service and/or populate a user profile via STB **201**, utilizing an input interface, such as control device **217** and/or end terminal **207**, via remote applications **209***c* and/or **209***a*.

[0066] After generating a user profile, MSP **117** may store a list of subscribers to the service, as well as a list of subscriber STB identifiers, authentication information, and user-defined profiles (including user-specific policies, subscription service options, and/or configuration data) for one or more STBs **101***a*-**101***n* and associated peripheral devices (e.g., display **221**, audio system **231**, etc.). Additionally (or alternatively), users may directly interact with user profile repository **127**. Further, user profile information and/or configuration data may be stored within respective user equipment (e.g., STBs **101***a*-**101***n*). In step **303**, the subscriber may interact with, for instance, an input interface of a remotely located end terminal **107** to launch a remote application (e.g., remote application **209***a* or **209***b*). Alternatively, the subscriber may launch remote application **209***c* via, for instance, SIB **101***n*. The remote application enables the subscriber to select a subscription service option to configure, such as the user profile information or subscription service settings or configurations previously mentioned, from any given location, at any given time, assuming sufficient connectivity to system **100** is made available through one or more end terminals or media-based devices.

[0067] As seen in FIG. **4**, a user interface **400** is provided, wherein an authenticated subscriber may directly review and modify user profile information and/or network settings (collectively referred to as subscription service options and configurations). User interface **400** may be invoked using a number of different methods. For example, the user may select a dedicated "MENU" button on control device **217** or on a peripheral device communicatively coupled thereto (or associated therewith), such as end terminal **207**. It is recognized that any other suitable actuator of these devices may be additionally, or alternatively, used to access the functionality of interface **400**, such as triggering a "GUIDE" icon or other suitable graphical element. Further, interface **400** may be evoked by selecting an option within another interface or application (e.g., when navigating from a public screen to a user-specific screen, i.e., a private screen). As such, an executing device (e.g., STB **201**, server **205**, end terminal **207**, etc.) may require sufficient authentication information (e.g., username, password, etc.) to be input in order to access the functions of interface **400**. Accordingly, interface **400** includes input fields **401** and **403** for a username and password, respectively. In alternative embodiments, input fields **401** and **403** may be configured to correspond to associated authentication information, such as entering a MAC address and password, etc.

[0068] In the illustrated embodiment, user interface **400** may include one or more interactive panes, such as panes **405** and **407**. In particular embodiments, as will be described in more detail below, the content of pane **407** may be dynamically updated to display various information related to actions conducted within pane **405**, and vice versa. Pane **405** (i.e., a navigation pane) includes a listing of selectable entries corresponding to one or more configurable parameters (or options) that may be associated with a subscription service, such as those parameters previously mentioned. In other embodiments, pane **405** may include a navigation tree, an expandable table of contents, or FlashMedia presentation of selectable entries. Based on a particular selection within pane **405**, pane **407** (i.e., a parameter review and modification pane) may be populated with appropriate input fields, selectable elements (e.g., toggle buttons, check boxes, radio buttons, sliders, list boxes, spinners, drop-down lists, menus, toolbars, ribbons, combo boxes, icons, etc.), output fields (e.g., labels, tooltips, balloon helps status bars, progress bars, infobars, etc.) and windows, as well as any other suitable interface widget for inputting (or otherwise perceiving) configurable parameters. In turn, actions within pane **407** may affect selectable parameters within pane **405**.

[0069] Navigational elements/fields, e.g., scrollbars **409** and **411**, as well as tabs **413***a*-**413***d*, may be provided and configured to indicate the existence of additional entries not displayed, but navigably available, as well as facilitate interface usability. Accordingly, users may browse to these entries via, for instance, an input interface of end terminal **207**, e.g., a cursor control. One or more fixed focus states (e.g., border **415**) and/or distinctive magnification features, e.g., color, brightness, bolding, font type, text size, etc., may be used to convey a "currently" navigated position or parameter to be entered. In certain embodiments, a plurality of graphical elements may be provided to correspond to the one or more options and/or configurations of the subscription service to aid usability, and thus may be displayed therewith.

[0070] In this manner, when a user navigates to a desired entry, actuation of, for instance, a "USER PROFILE" tab **413***a* or a "NETWORK SETTINGS" tab **413***c* may launch corresponding subscription service options and configuration fields within panes **405** and **407**. In other embodiments, aural descriptions or effects may be provided when a user navigates, for instance, a cursor over particular fields of panes **405** and **407**. An "ADD TAB" tab **413***d* may be provided for users to configure a personalized interface to make particular subscription service options more readily available, such as parental control options or channel availability features. Additionally, interface **400** may be configured to accept verbal commands for entering suitable data into entry fields within pane **407** or making selections within pane **405**. In other embodiments, interface **400** may include fields for targeted advertisements **417** generated based on metadata concerning information within a user profile or media content received at one or more STBs **101***a*-**101***n*, as well as fields for MSP logos **419**, or other suitable field. Tab **413***b* is explained in greater detail with respect to FIGS. **5***a*-**6**.

[0071] Referring back to FIG. **3**, the user may input a setting to the remotely located end terminal **207** for managing subscription service options and configurations, per step **305**. In step **307**, end terminal **207**, via one or more executed remote applications **209***a* or **209***b*, may transmit a signal to an interface, e.g., a communication interface, of service provider network **103**, server **105**, user profile repository **127**, etc., based on the user input. More specifically, the transmitted signal may be received at an interface of user profile repository **127** directly or indirectly via an interface of, for instance, MSP **117** or server **105**, wherein one or more of these interface (via a processor) can configure the subscription service option and/or configuration parameter based on the received signal. Such configuration may be executed in real-time, thus having substantially immediate effect on the user's account and available media content at STBs **101***a*-**101***n*.

[0072] In some embodiments, one or more remote applications **209***a*-**209***c* may be utilized to configure a plurality of STBs **101***a*-**101***n*, either in real-time or periodically. FIGS. **5***a* and **5***b* are flowcharts of processes for remote management of one or more set-top boxes of FIG. **2**, according to exemplary embodiments. FIG. **6** is a diagram of an exemplary user interface configured for this purpose.

[0073] In particular, FIG. **5***a* illustrates an exemplary process for real-time, remote management of one or more STBs from an end terminal perspective. In step **501**, a user executes a remote interface (e.g., remote application **209***a* executing on server **205**) via a first device, such as an end terminal **207**. In alternative embodiments, the user may initialize a local, remote application **209***b* from a remote location, via end terminal **207**. Still further, remote application **209***c* may be implemented on, for instance STB **101***n*, from a remote location to remotely manage one or more STBs (e.g., STBs **101***a*-**101***n*).

[0074] As previously described, a remote application, e.g., user interface **600**, may be evoked using a number of different methods. For example, the user may select a dedicated "MENU" button on control device **217** or on a peripheral device, such as end terminal **207**. It is recognized that any other suitable actuator of these devices may be additionally, or alternatively, used to access the functionality of interface **600**, such as triggering a "GUIDE" icon or other suitable graphical element. Further, interface **600** may be evoked by selecting an option within another interface or application (e.g., when navigating from a public screen to a user-specific screen, i.e., a private screen, or navigating from interface **400** to interface **600**, such as by interacting with tab **413***b* of interface **400**, i.e., tab **601***b* of interface **600**). As such, interface **600** may include input fields **603** and **605** for a username and password, respectively. In alternative embodiments, input fields **603** and **605** may be configured to correspond to associated authentication information, such as entering a MAC address and password, etc. Alternatively, a "WELCOME, USERNAME" message may appear for previously authenticated subscribers.

[0075] As seen in FIG. **6**, an interface **600** is provided, wherein an authenticated subscriber may directly review and modify device configurations, such as for STBs **201**, displays **221**, audio systems **231**, peripheral devices, etc. As with interface **400**, interface **600** may include one or more interactive panes, such as panes **607** and **609**, wherein, the content of pane **609** may be dynamically updated to display various information related to actions conducted within pane **607**, and vice versa. Pane **607** (i.e., a navigation pane) includes a listing of selectable entries corresponding to one or more configurable parameters (or options/data) that may be associated with a configurable device, such as an STB, wherein the configuration data includes those parameters previously mentioned. In other embodiments, pane **607** may include a navigation tree, an expandable table of contents, or FlashMedia presentation of selectable entries, as well as other equivalent listings. Based on a particular selection within pane **607**, pane **609** (i.e., a parameter review and modification pane) may be populated with appropriate input fields, selectable elements, output fields, and windows, as well as any other suitable interface widget for inputting (or otherwise perceiving) configurable parameters, as with pane **407** previously described. In turn, actions within pane **609** may affect selectable parameters within pane **607**.

[0076] Navigational elements/fields, e.g., scrollbars **611** and **613**, as well as tabs **601***a*-**601***d*, may be provided and configured to indicate the existence of additional entries not displayed, but navigably available, as well as facilitate interface usability. Accordingly, users may browse to these entries via, for instance, an input interface of end terminal **207**, e.g., a cursor control. One or more fixed focus states (e.g., border **615**) and/or distinctive magnification features, e.g., color, brightness, bolding, font type, text size, etc., may be used to convey a "currently" navigated position or parameter to be entered. In certain embodiments, a plurality of graphical elements may be provided to correspond to the one or more options and/or configurations of the device(s) being configured to aid usability, and thus may be displayed therewith.

[0077] In this manner, when a user navigates to a desired entry, actuation of, for instance, a "DEVICE CONFIGURATION" tab **601***b* may launch corresponding configuration data, fields within panes **607** and **609**. Further, a drop-down list field **617** may be provided for selecting a particular device to configure, e.g., "STB." Also, a drop-down list field **619** may permit users to program, configure, or otherwise control particular workgroups of devices, such as "WORKGROUP A," e.g., workgroup **115** comprising STBs **101***a*-**101***n*. To this effect, authorized subscribers may configure a plurality of media-based devices from a single, remote location, at any given point in time. These devices may be associated with the controlling subscriber, or may be associated with one or more other subscribers. Further, the devices may be situated in different physical locations, or disseminated among one or more user premises.

[0078] In other embodiments, aural descriptions or effects may be provided when a user navigates, for instance, a cursor over particular fields of panes **607** and **609**, as well as drop-down lists **617** and **619**. An "ADD TAB" tab **601***d* may be provided for users to configure a personalized interface to make particular device configurations more readily available, such as parental control options, available channel options, favorite channel specifications, program recording settings, viewing history, software loaded on a device, as well as other suitable parameters. Moreover, interface **600** may be configured to accept verbal commands for entering suitable data into entry fields within pane **609** or making selections within pane **607** or from drop-down lists **617** and **619**. In other embodiments, interface **600** may include fields for targeted advertisements **621** generated based on metadata concerning information within a user profile or media content received at one or more STBs **101***a*-**101***n*, as well as fields for MSP logos **623**, or other suitable field. Further, interface **600** may include a status field **625** for ascertaining the state of one or more

STBs **101***a*-**101***n*. For instance, interaction with field **625** may provide a powering state (e.g., on/off), current programming being experienced, whether a device is currently recording a program, etc.

[0079] Referring back to FIG. **5***a*, the user (per step **503**) may select (from pane **607**) a function governing one or more secondary device(s), e.g., STBs **101***a*-**101***n*, to control and/or configure. Doing so may dynamically modify pane **609** to present various input fields, selectable elements, output fields, windows, etc., for configuring the one or more STBs **101***a*-**101***n*. At step **505**, the user can input a command to the remote interface, e.g., remote application **209***c*, via an input interface of, for instance, end terminal **207**. In response to the user input, the remote application **209***c*, via a processor, may generate one or more commands for controlling the plurality of STBs **101***a*-**101***n*, and transmit the command to the STBs **101***a*-**101***n* to configure the devices **101***a*-**101***n*. Accordingly, the transmitted command may seamlessly configure, in real-time, the one or more secondary device(s) located at a remote location, per step **507**.

[0080] In alternative embodiments, a user at a remote end terminal **207**, via remote application **209***b*, may effectuate the process of FIG. **5***a*, either directly or indirectly via server **105** and/or MSP **117**. Still further, a subscriber may execute the process of FIG. **5***a* via a remote STB (e.g., STB **101***n*), implementing a local, remote application **113***c*, remote application **113***b*, or remote applications **113***a*. As such, system **100** components are capable of peer-to-peer connections facilitated via server **105** or MSP **117**, as well as routing communications through these centralized components. In any event, the configuration process may be conducted in real-time, thus having substantially immediate effect.

[0081] For instance, a subscriber to the remote management service may receive a phone call at work from his children (at home) asking whether they may watch a certain VOD program they just viewed in a commercial. The subscriber may access an online remote application **209***a* available via server **105** over packet-based network **109** (e.g., the Internet), using for instance a first end terminal **107** (e.g., a PC). As such, the user may implement the process of FIG. **5***a* utilizing interface **600** of FIG. **6** to specify a VOD selection requested by the children. Upon entering the selection, the user may also select certain STBs **101***a* and **101***b* from which the children may experience the program, i.e., STBs located at the respective children's rooms, and limit access to other STBs (e.g., STB **101***n*), such as an STB in the subscriber's personal room.

[0082] Accordingly, remote application **209***a* may generate one or more control commands, transmit those commands to STBs **101***a*-**101***n*, wherein the devices may be configured according to the commands. As such, the children will be able to immediately experience the VOD program instead of having to wait until their parent arrives home from work to manipulate one or more STBs to acquire the media content. Further, the subscriber may later, at a second end terminal **107** (e.g., a mobile handset) remotely access a remote application (e.g., remote application **209***a*) to ascertain the state of the programmed STBs **101***a*-**101***n* via status field **625** of interface **600**. In this manner, the subscriber may determine whether or not the children are still watching the program, etc.

[0083] FIG. **5***b* illustrates an exemplary process for scheduled remote management of one or more STBs from a remote interface(s), e.g., remote application(s), perspective(s). In step **521**, a remote interface, e.g., remote application **209***a*, receives a command to control one or more STBs from an authenticated user at an end terminal **207**. Pane **609** of interface **600** may be utilized for this purpose. In this example, however, the subscriber may input a control schedule. For instance, a user at work may execute one or more remote applications, e.g., remote application **209***b*, via an end terminal **207**, such as a mobile handset. To this effect, remote application **209***b* may be a thin-client version or a fully functional version of, for instance, remote application **209***a*.

[0084] Remote application **209***b* includes a user interface **600** with a recording function instance. Accordingly, the user via panes **607** and **609** may specify a list of content to be recorded by one or more STBs **101***a*-**101***n*, at for instance, his home and vacation cottage. The list of content may include programs currently available or will be made available sometime in the future. As such, the user may specify conventional recording commands (e.g., date, time, duration, channel, etc.) of the specified programming or may simply specify media content parameters (e.g., title, actors, producer, etc.) wherein the remote application **209***b* may request sufficient media content from server **105**, MSP **117**, and/or third party sources (e.g., television broadcast systems **123**, content provider systems **125**, content repository **121**, etc.) to satisfy the request.

[0085] In certain embodiments, remote application **209***b* may enable subscribers to search for content to be recorded, such as search by keyword (e.g., actor, program title, publication date/time, program description, genre, rating, or any other suitable search string), or search by content type (e.g., media content taking the form of audio streams, video streams, pictographic content, etc.), as well as any other suitable search option. In other embodiments, various search options may be combined or strung together by logical operators/connectors, e.g., and, or, not, etc. Thus, search options may allow users to perform complex (or Boolean) searches. Still further, users can implement third party search engines accessible over a data network, e.g., Google, wherein corresponding search results may be automatically ported to the remote application or simply "copied and pasted" when necessary. In any case, search results may be acquired via metadata correlation, i.e., based on available media content descriptions related to searching parameters.

[0086] In step **523**, upon a triggering event (i.e., satisfaction of one or more control schedule conditions, such as the content becoming available or the occurrence of a recording command), remote application **209***b* may generate one or more control commands to record one or more content instances from the user specified list, at one or more STBs **101***a*-**101***n*. The signal can be transmitted to each of the specified STBs **101***a*-**101***n* to record the programming, per step **525**. In step **527**, the one or more STBs are configured based on the received signal and may effectuate the recording procedure. In other embodiments, subscribers may implement the process of FIG. **5***b* via remote applications **209***a* and/or **209***c* via, for instance, an end terminal **207** and/or an STB (e.g., STB **101***n*).

[0087] The processes described herein for remote services management may be implemented via software, hardware (e.g., general processor, Digital Signal Processing (DSP) chip, an Application Specific Integrated Circuit (ASIC), Field Programmable Gate Arrays (FPGAs), etc.), firmware or a combination thereof. Such exemplary hardware for performing the described functions is detailed below.

[0088] FIG. **7** illustrates computing hardware (e.g., computer system) **700** upon which an embodiment according to

the invention can be implemented. The computer system **700** includes a bus **701** or other communication mechanism for communicating information and a processor **703** coupled to the bus **701** for processing information. The computer system **700** also includes main memory **705**, such as a random access memory (RAM) or other dynamic storage device, coupled to the bus **701** for storing information and instructions to be executed by the processor **703**. Main memory **705** can also be used for storing temporary variables or other intermediate information during execution of instructions by the processor **703**. The computer system **700** may further include a read only memory (ROM) **707** or other static storage device coupled to the bus **701** for storing static information and instructions for the processor **703**. A storage device **709**, such as a magnetic disk or optical disk, is coupled to the bus **701** for persistently storing information and instructions.

[0089] The computer system **700** may be coupled via the bus **701** to a display **711**, such as a cathode ray tube (CRT), liquid crystal display, active matrix display, or plasma display, for displaying information to a computer user. An input device **713**, such as a keyboard including alphanumeric and other keys, is coupled to the bus **701** for communicating information and command selections to the processor **703**. Another type of user input device is a cursor control **715**, such as a mouse, a trackball, or cursor direction keys, for communicating direction information and command selections to the processor **703** and for controlling cursor movement on the display **711**.

[0090] According to an embodiment of the invention, the processes described herein are performed by the computer system **700**, in response to the processor **703** executing an arrangement of instructions contained in main memory **705**. Such instructions can be read into main memory **705** from another computer-readable medium, such as the storage device **709**. Execution of the arrangement of instructions contained in main memory **705** causes the processor **703** to perform the process steps described herein. One or more processors in a multi-processing arrangement may also be employed to execute the instructions contained in main memory **705**. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions to implement the embodiment of the invention. Thus, embodiments of the invention are not limited to any specific combination of hardware circuitry and software.

[0091] The computer system **700** also includes a communication interface **717** coupled to bus **701**. The communication interface **717** provides a two-way data communication coupling to a network link **719** connected to a local network **721**. For example, the communication interface **717** may be a digital subscriber line (DSL) card or modem, an integrated services digital network (ISDN) card, a cable modem, a telephone modem, or any other communication interface to provide a data communication connection to a corresponding type of communication line. As another example, communication interface **717** may be a local area network (LAN) card (e.g. for Ethernet™ or an Asynchronous Transfer Model (ATM) network) to provide a data communication connection to a compatible LAN. Wireless links can also be implemented. In any such implementation, communication interface **717** sends and receives electrical, electromagnetic, or optical signals that carry digital data streams representing various types of information. Further, the communication interface **717** can include peripheral interface devices, such as a Universal Serial Bus (USB) interface, a PCMCIA (Personal Computer Memory Card International Association) interface, etc. Although a single communication interface **717** is depicted in FIG. **7**, multiple communication interfaces can also be employed.

[0092] The network link **719** typically provides data communication through one or more networks to other data devices. For example, the network link **719** may provide a connection through local network **721** to a host computer **723**, which has connectivity to a network **725** (e.g. a wide area network (WAN) or the global packet data communication network now commonly referred to as the "Internet") or to data equipment operated by a service provider. The local network **721** and the network **725** both use electrical, electromagnetic, or optical signals to convey information and instructions. The signals through the various networks and the signals on the network link **719** and through the communication interface **717**, which communicate digital data with the computer system **700**, are exemplary forms of carrier waves bearing the information and instructions.

[0093] The computer system **700** can send messages and receive data, including program code, through the network (s), the network link **719**, and the communication interface **717**. In the Internet example, a server (not shown) might transmit requested code belonging to an application program for implementing an embodiment of the invention through the network **725**, the local network **721** and the communication interface **717**. The processor **703** may execute the transmitted code while being received and/or store the code in the storage device **709**, or other non-volatile storage for later execution. In this manner, the computer system **700** may obtain application code in the form of a carrier wave.

[0094] The term "computer-readable medium" as used herein refers to any medium that participates in providing instructions to the processor **703** for execution. Such a medium may take many forms, including but not limited to non-volatile media, volatile media, and transmission media. Non-volatile media include, for example, optical or magnetic disks, such as the storage device **709**. Volatile media include dynamic memory, such as main memory **705**. Transmission media include coaxial cables, copper wire and fiber optics, including the wires that comprise the bus **701**. Transmission media can also take the form of acoustic, optical, or electromagnetic waves, such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, any other magnetic medium, a CD-ROM, CDRW, DVD, any other optical medium, punch cards, paper tape, optical mark sheets, any other physical medium with patterns of holes or other optically recognizable indicia, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave, or any other medium from which a computer can read.

[0095] Various forms of computer-readable media may be involved in providing instructions to a processor for execution. For example, the instructions for carrying out at least part of the embodiments of the invention may initially be borne on a magnetic disk of a remote computer. In such a scenario, the remote computer loads the instructions into main memory and sends the instructions over a telephone line using a modem. A modem of a local computer system receives the data on the telephone line and uses an infrared transmitter to convert the data to an infrared signal and transmit the infrared signal to a portable computing device, such as

a personal digital assistant (PDA) or a laptop. An infrared detector on the portable computing device receives the information and instructions borne by the infrared signal and places the data on a bus. The bus conveys the data to main memory, from which a processor retrieves and executes the instructions. The instructions received by main memory can optionally be stored on storage device either before or alter execution by processor.

[0096] While certain exemplary embodiments and implementations have been described herein, other embodiments and modifications will be apparent from this description. Accordingly, the invention is not limited to such embodiments, but rather to the broader scope of the presented claims and various obvious modifications and equivalent arrangements.

What is claimed is:

1. A method comprising:

receiving a command from a computing device for controlling a plurality of set-top boxes; and

configuring the set-top boxes according to the received command.

2. A method according to claim **1**, wherein the configuration is performed in real-time.

3. A method according to claim **1**, wherein one of the set-top boxes includes a recording function and the command specifies a list of content to be recorded by the one set-top box.

4. A method according to claim **1**, wherein the set-top boxes are associated with a single subscriber.

5. A method according to claim **1**, wherein the set-top boxes are situated in different physical locations.

6. A method according to claim **1**, wherein the computing device executes a web-based application to issue the command.

7. A method according to claim **1**, wherein the command specifies a video-on-demand selection.

8. A method according to claim **1**, wherein a user of the computing device utilizes the computing device to manage subscription service for the set-top boxes.

9. A method according to claim **1**, further comprising:

storing configuration data within the respective set-top boxes, wherein the configuration data relates to either parental control, available channel information, favorite channels specified by a user, program recording setting, viewing history, or software loaded in the respective set-top boxes.

10. An apparatus comprising:

a processor configured to receive a command from a computing device for controlling a plurality of set-top boxes,

wherein the processor is further configured to configure the set-top boxes according to the received command.

11. An apparatus according to claim **10**, wherein the configuration is performed in real-time.

12. An apparatus according to claim **10**, wherein one of the set-top boxes includes a recording function and the command specifies a list of content to be recorded by the one set-top box.

13. An apparatus according to claim **10**, wherein the set-top boxes are associated with a single subscriber.

14. An apparatus according to claim **10**, wherein the set-top boxes are situated in different physical locations.

15. An apparatus according to claim **10**, wherein the computing device executes a web-based application to issue the command.

16. An apparatus according to claim **10**, wherein the command specifies a video-on-demand selection.

17. An apparatus according to claim **10**, wherein a user of the computing device utilizes the computing device to manage subscription service for the set-top boxes.

18. An apparatus according to claim **10**, further comprising:

a memory configured to store configuration data within the respective set-top boxes, wherein the configuration data relates to either parental control, available channel information, favorite channels specified by a user, program recording setting, viewing history, or software loaded in the respective set-top boxes.

19. A method comprising:

presenting, via an end terminal, a user interface configured to permit a subscriber to establish a workgroup of set-top boxes;

receiving an input from the subscriber, via the user interface, to make content available at one or more of the set-top boxes of the workgroup;

generating a signal for configuring the one or more set-top boxes based on the input; and

transmitting the signal to the one or more set-top boxes to configure the one or more set-top boxes.

20. A method of claim **19**, wherein the end terminal is a computing device, a mobile device, a telephony device, or a set-top box of the workgroup.

21. A method of claim **20**, wherein the end terminal is remotely located from the workgroup and the configuration is performed in substantially real-time.

22. A method of claim **19**, wherein the input effects a service subscription option and the content is an audio on-demand or video on-demand selection.

23. A method of claim **19**, wherein the set-top boxes of the workgroup are associated with the subscriber, associated with other subscribers, or a combination thereof.

24. A method of claim **19**, wherein the user interface is further configured to permit the subscriber to monitor a state of one or more of the set-top boxes of the workgroup.

25. A method comprising:

providing a web-based interface configured to permit a user to control a plurality of associated set-top boxes;

receiving an input from the user specifying content to be recorded by a set-top box within the plurality; and

configuring the set-top box based on the input and according to a user-defined policy,

wherein the user defined policy includes a triggering event for recording the content.

26. A method of claim **25**, wherein the triggering event relates to date, time, and duration parameters.

27. A method of claim **25**, wherein the triggering event relates to availability of the content.

28. A method of claim **25**, further comprising:

making the content recorded by the set-top box available to other set-top boxes within the plurality of associated set-top boxes; and

configuring the other set-top boxes to enable on-demand access to the content,

wherein the user-defined policy further includes which other set-top boxes are to have access to the content.

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