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(54) CONTENT-PROGRESS INDICATOR FOR AN EPG

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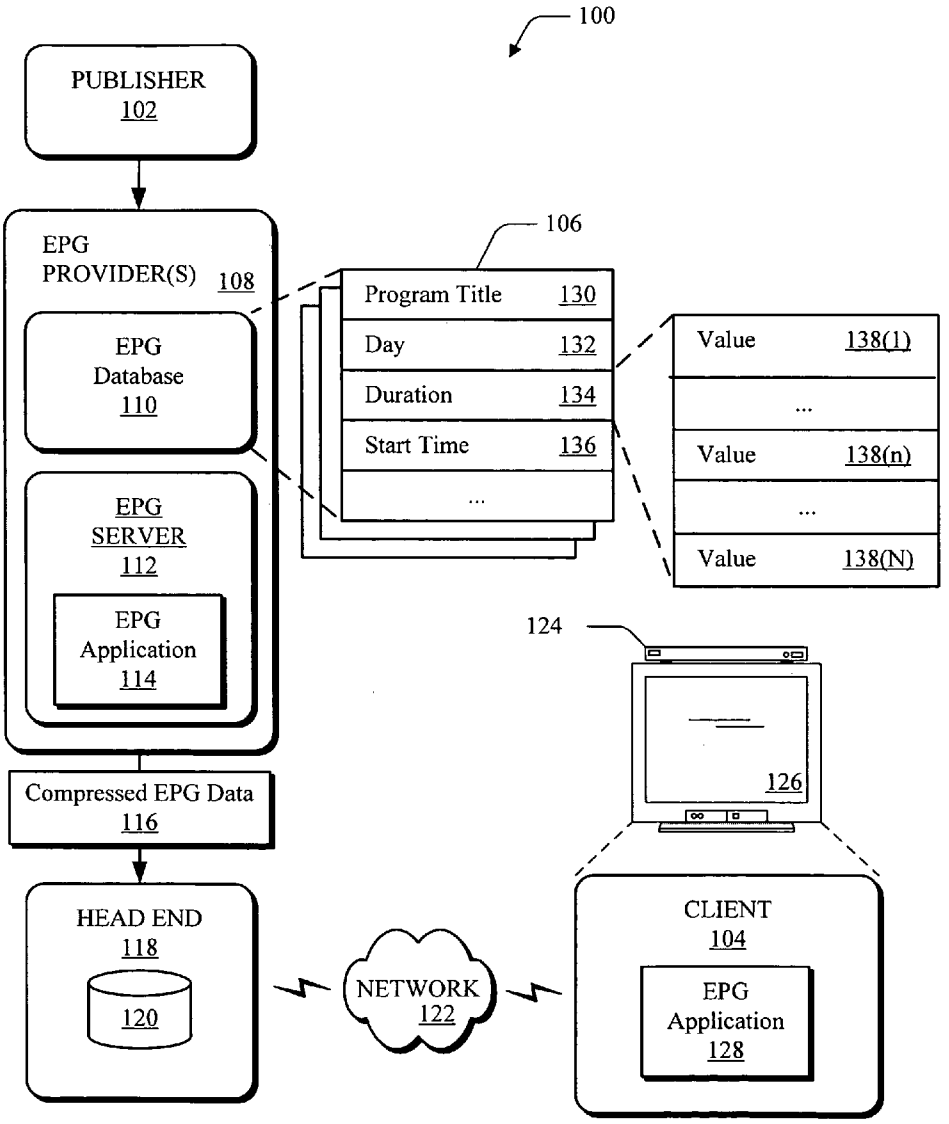
(57) ABSTRACT

A content-progress indicator for an EPG is described. In an implementation, a user interface (UI) for output by a client and for display by a display device includes a plurality of representation of content items and at least one pictorial representation. Each representation of a content item is selectable by a user to navigate to a corresponding content item. Each content item has a duration when streamed for output by the client. The at least one pictorial representation corresponds to a respective content item and indicates a time remaining in the duration of the respective content item.



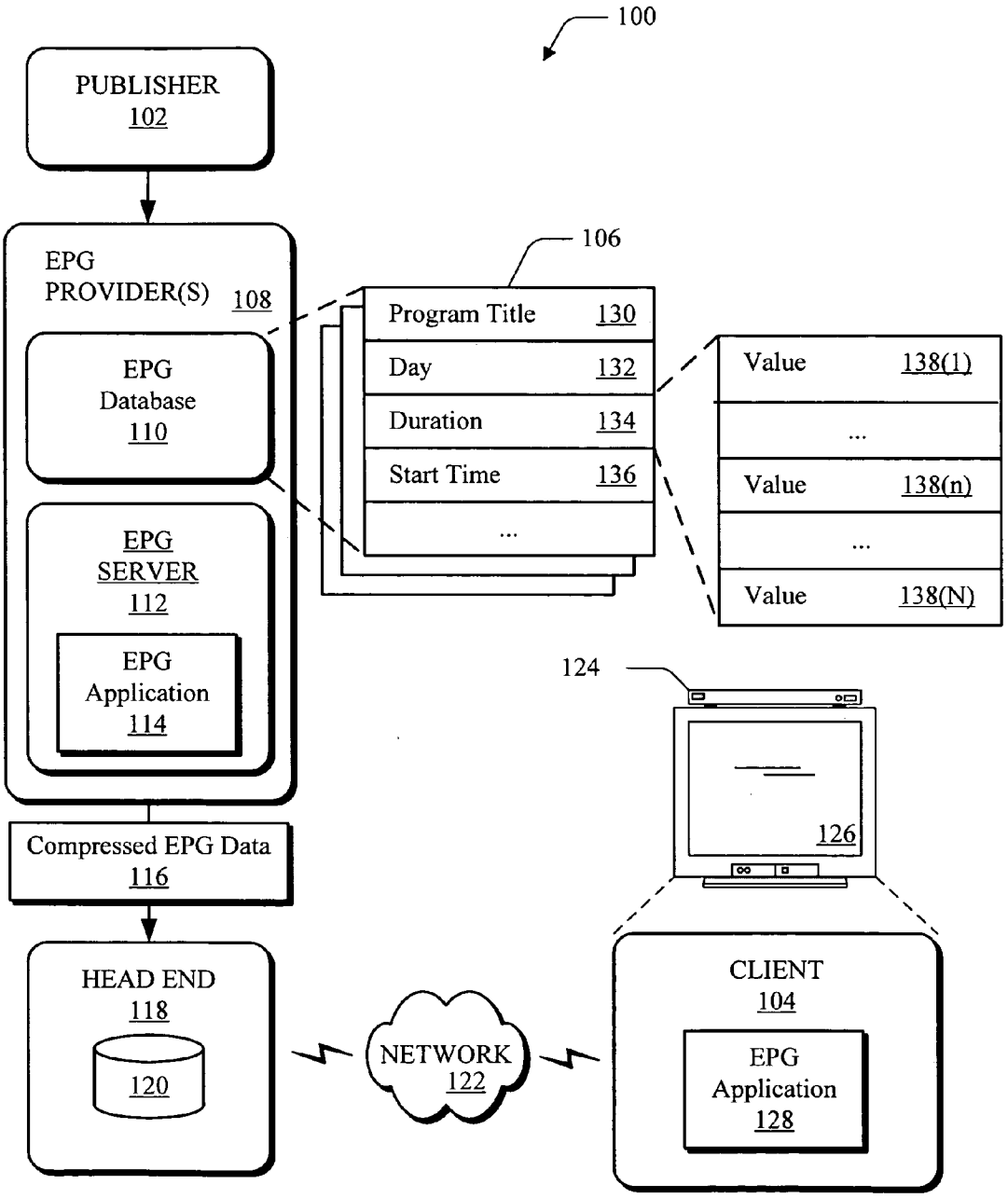

100
PUBLISHER
102
EPG
PROVIDER(S)
108
EPG
Database
110
EPG
SERVER
112
EPG
Application
114
106
Program Title
130
Day
132
Duration
134
Start Time
136
...
Value
138(1)
...
Value
138(n)
...
Value
138(N)
124
126
Compressed EPG Data
116
HEAD END
118
120
NETWORK
122
CLIENT
104
EPG
Application
128

Fig. 1

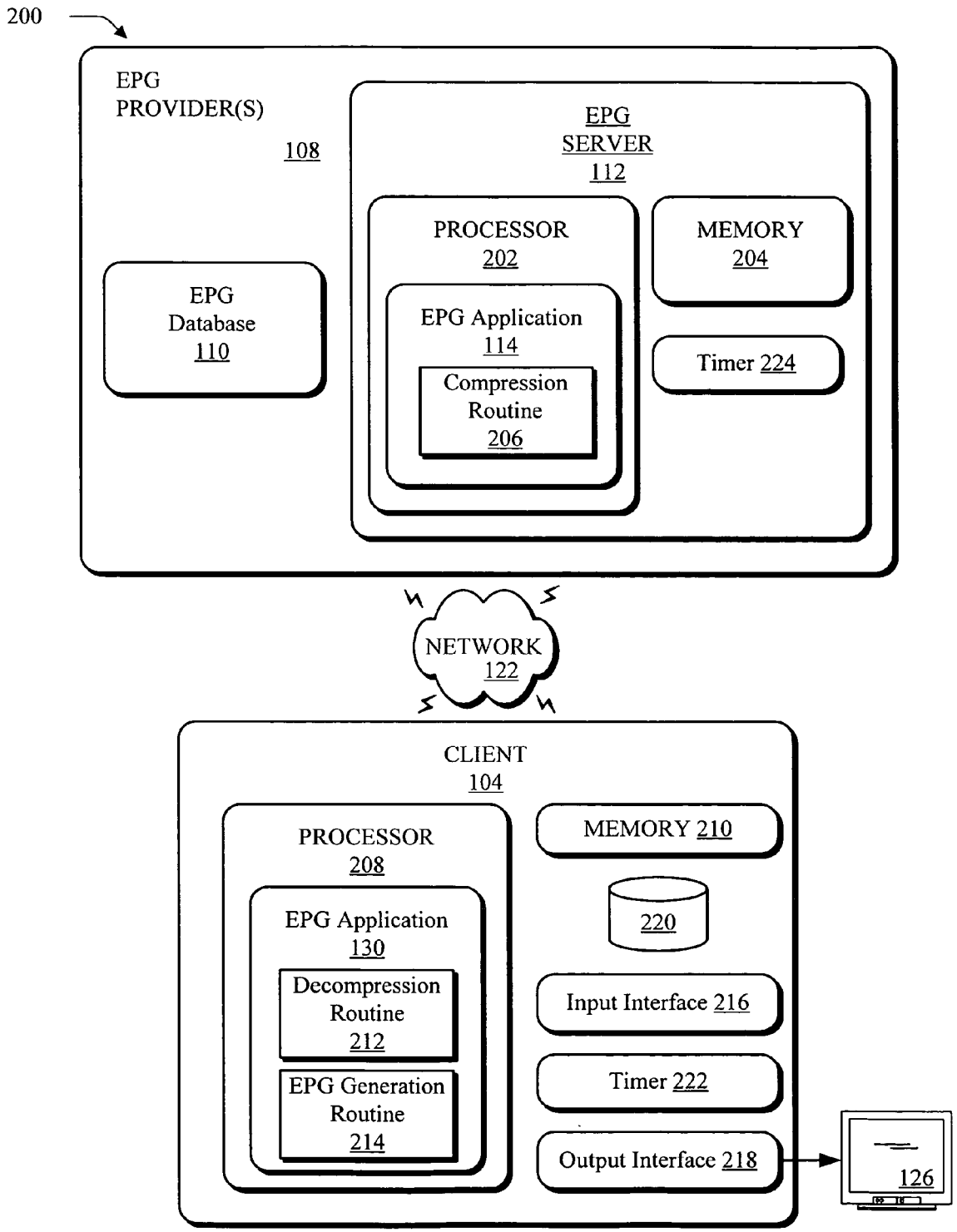

200
EPG
PROVIDER(S)
108
EPG
SERVER
112
PROCESSOR
202
MEMORY
204
EPG
Database
110
EPG Application
114
Compression
Routine
206
Timer 224
NETWORK
122
CLIENT
104
PROCESSOR
208
MEMORY 210
EPG Application
130
220
Decompression
Routine
212
Input Interface 216
EPG Generation
Routine
214
Timer 222
Output Interface 218
126

Fig. 2

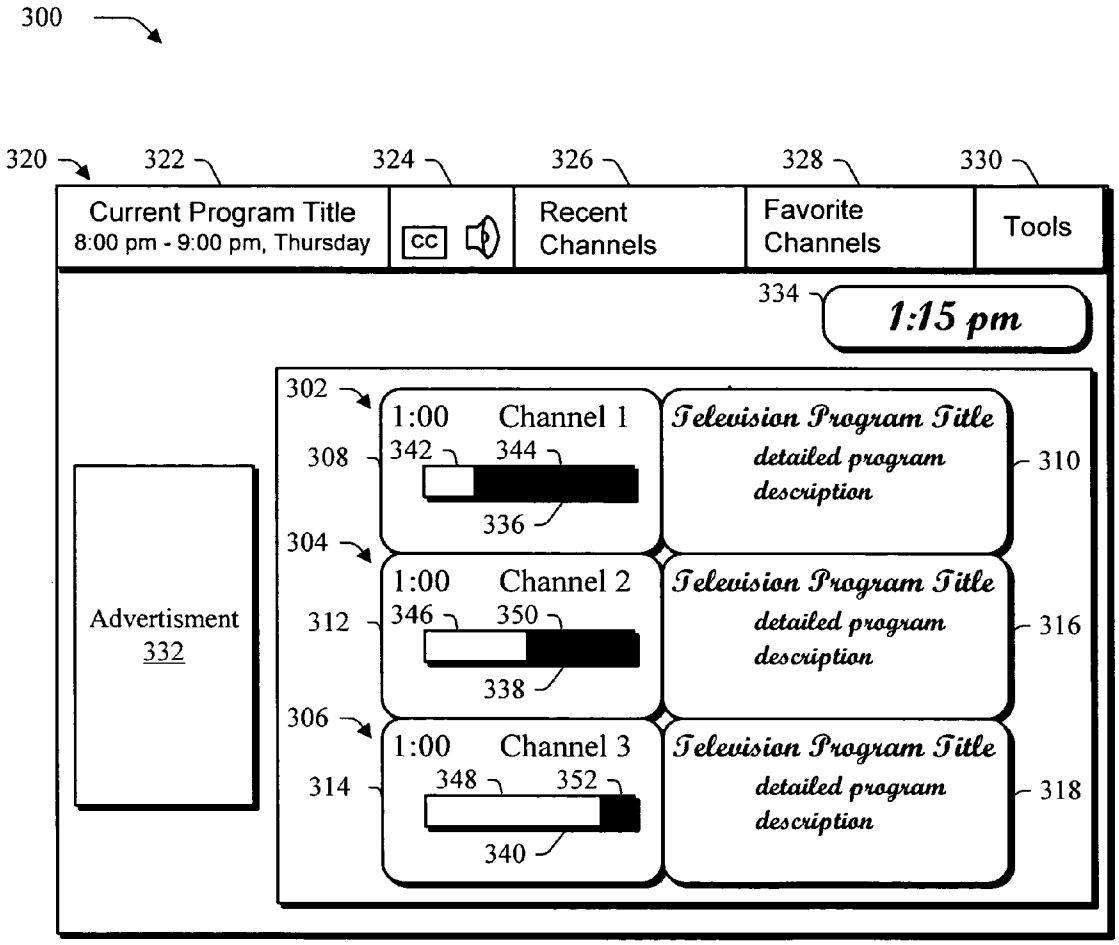

300
320
322
324
326
328
330
Current Program Title
8:00 pm - 9:00 pm, Thursday
CC
Recent Channels
Favorite Channels
Tools
334
1:15 pm
302
1:00 Channel 1
Television Program Title
detailed program description
308
342
344
336
310
304
1:00 Channel 2
Television Program Title
detailed program description
312
346
350
338
316
306
1:00 Channel 3
Television Program Title
detailed program description
314
348
352
340
318
Advertisment
332

Fig. 3

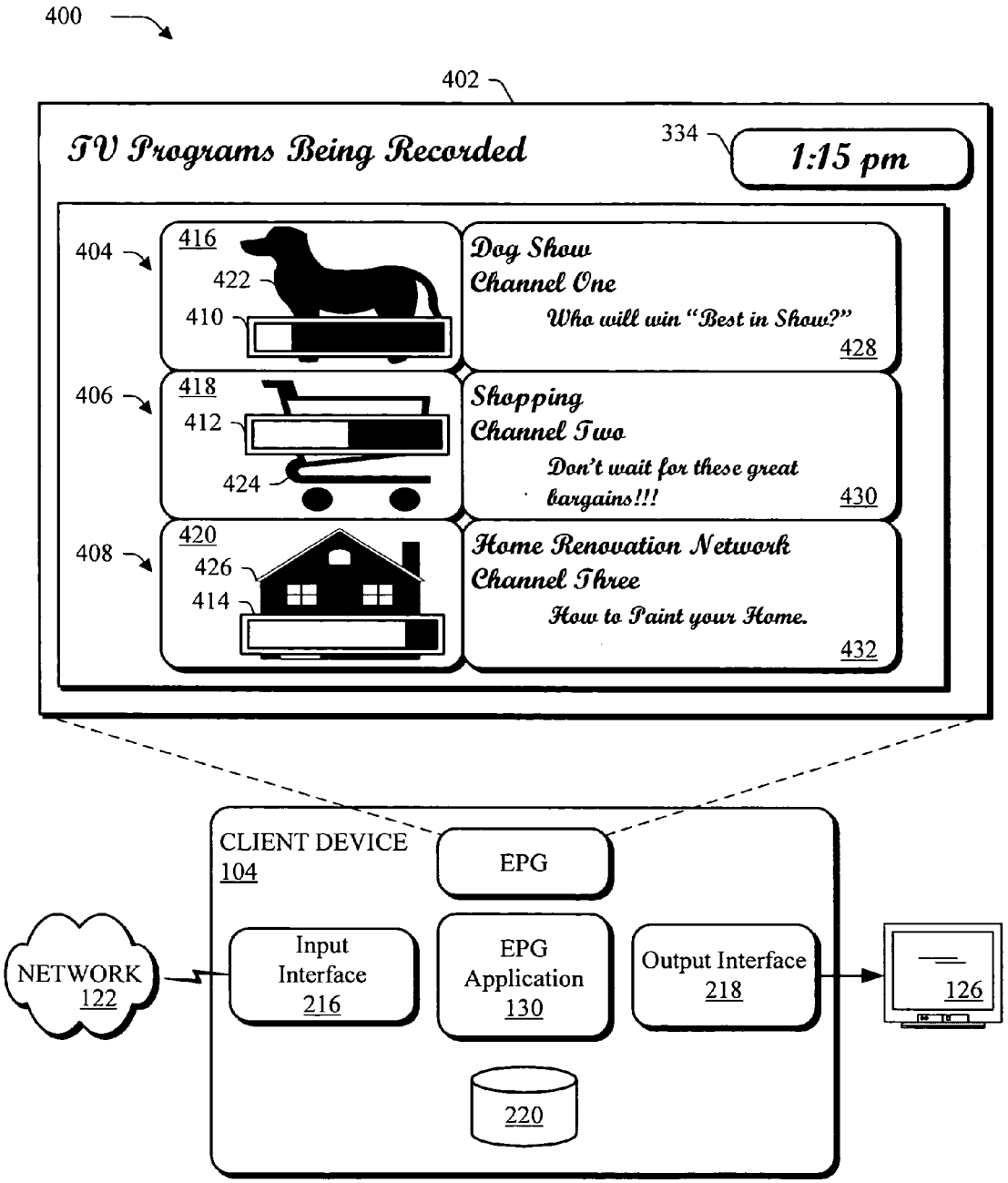

400
402
TV Programs Being Recorded
334
1:15 pm
404
416
422
410
Dog Show
Channel One
Who will win "Best in Show?"
428
406
418
412
424
Shopping
Channel Two
Don't wait for these great bargains!!!
430
408
420
426
414
Home Renovation Network
Channel Three
How to Paint your Home.
432
CLIENT DEVICE
104
EPG
NETWORK
122
Input Interface
216
EPG Application
130
Output Interface
218
126
220

Fig. 4

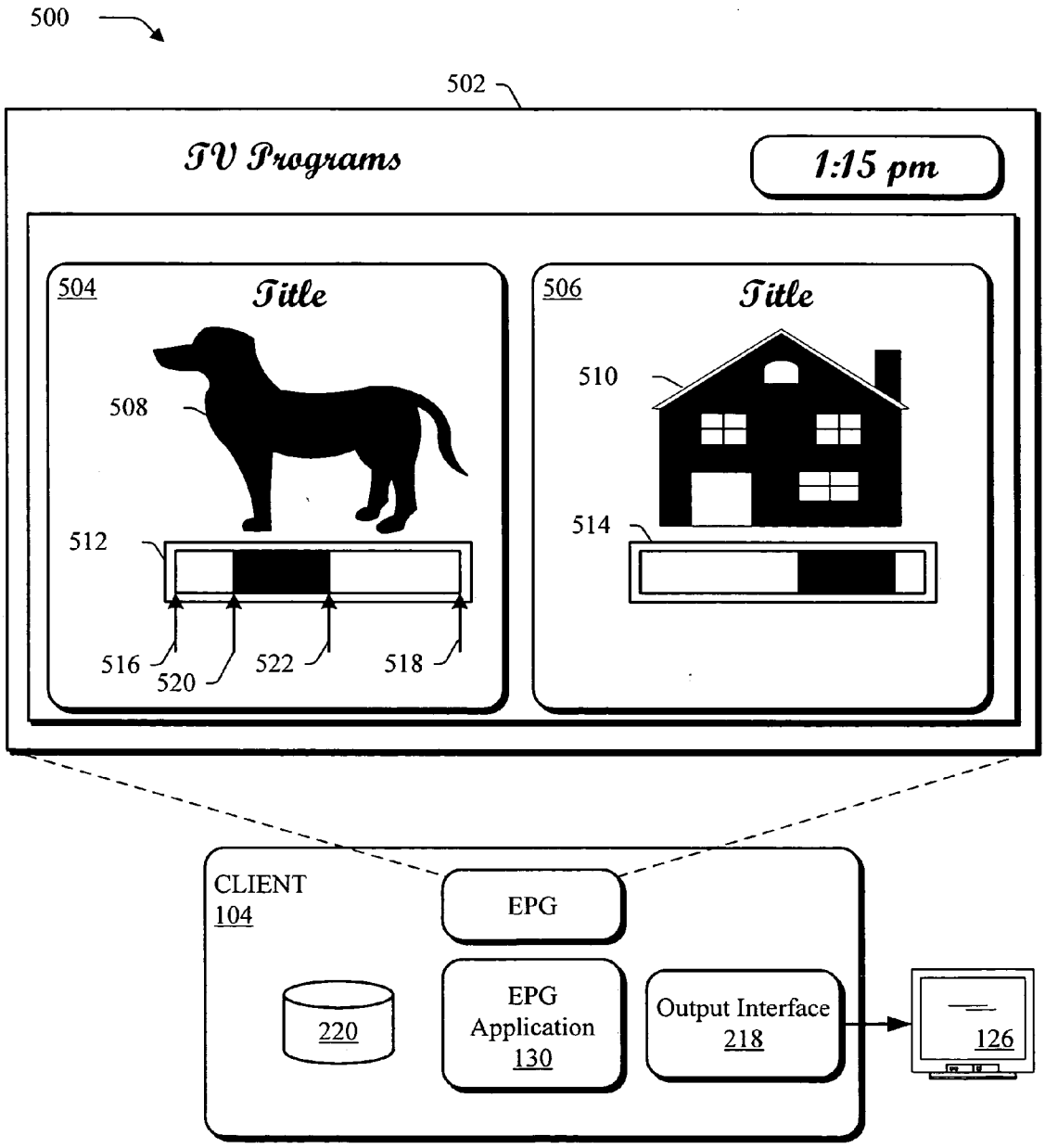

500
502
TV Programs
1:15 pm
504
Title
508
512
516
520
522
518
506
Title
510
514
CLIENT
104
EPG
220
EPG
Application
130
Output Interface
218
126

Fig. 5

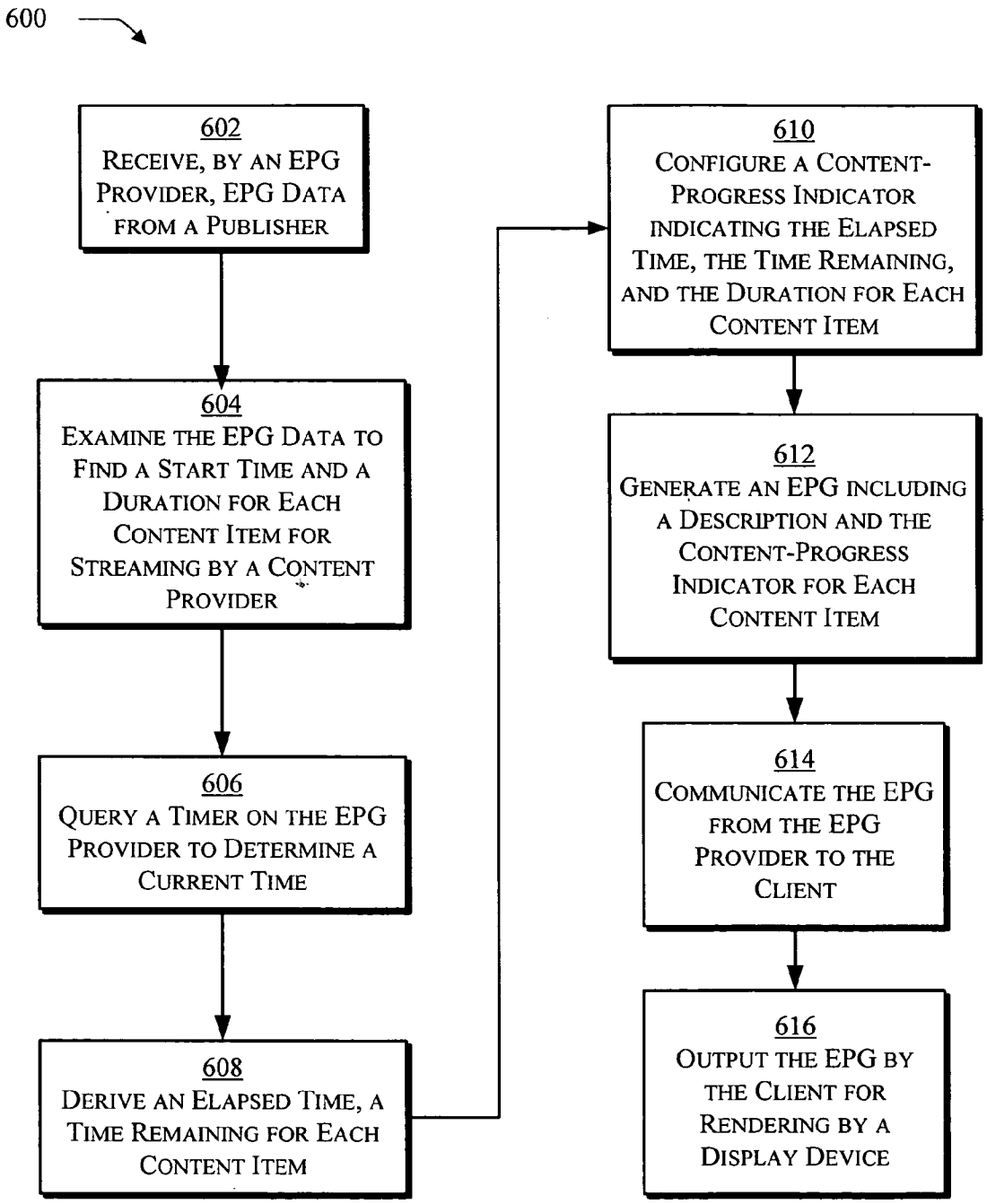

600
602
Receive, by an EPG Provider, EPG Data from a Publisher
604
Examine the EPG Data to Find a Start Time and a Duration for Each Content Item for Streaming by a Content Provider
606
Query a Timer on the EPG Provider to Determine a Current Time
608
Derive an Elapsed Time, a Time Remaining for Each Content Item
610
Configure a Content-Progress Indicator indicating the Elapsed Time, the Time Remaining, and the Duration for Each Content Item
612
Generate an EPG including a Description and the Content-Progress Indicator for Each Content Item
614
Communicate the EPG from the EPG Provider to the Client
616
Output the EPG by the Client for Rendering by a Display Device

Fig. 6

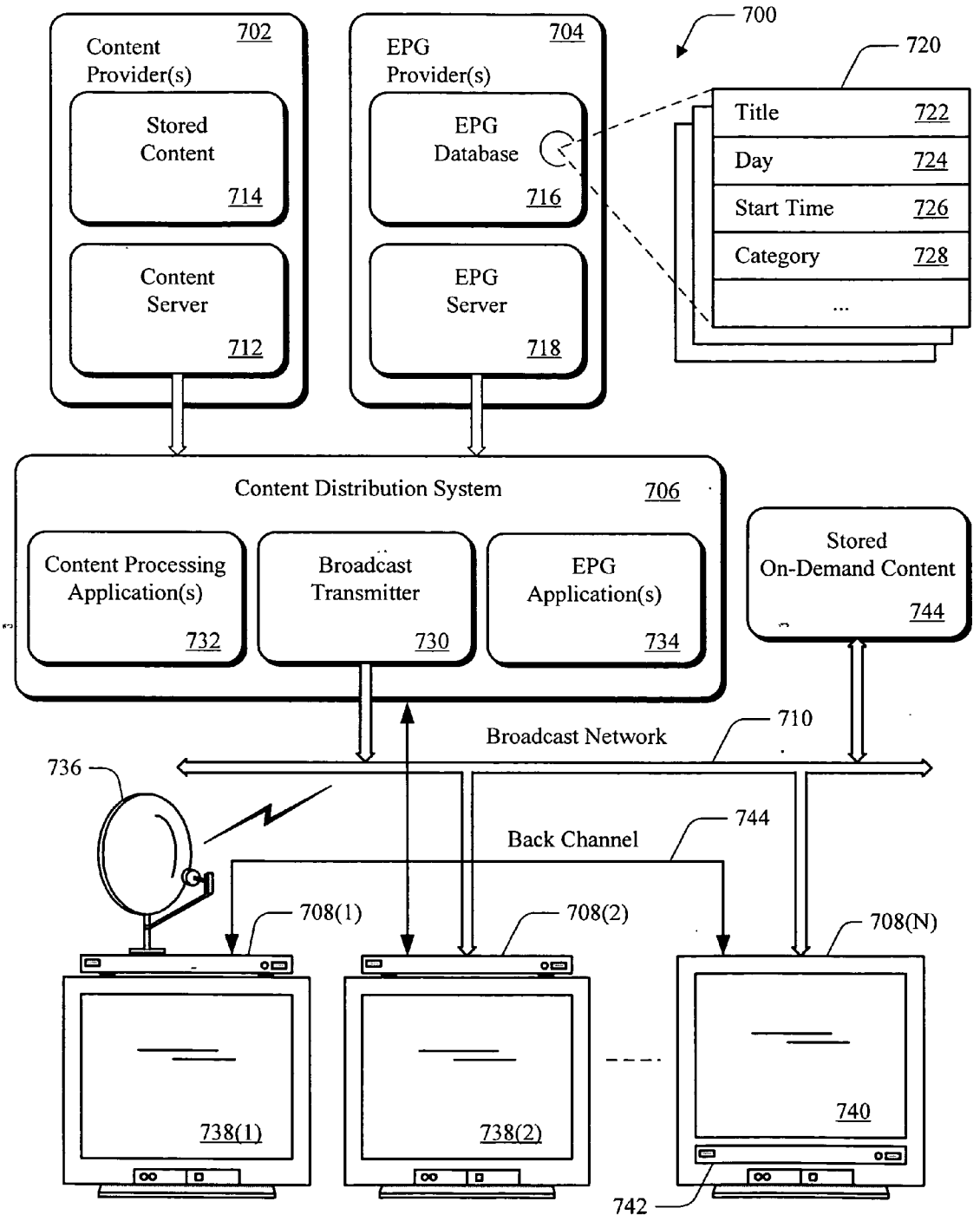

700
Content Provider(s)
702
Stored Content
714
Content Server
712
EPG Provider(s)
704
EPG Database
716
EPG Server
718
720
Title
722
Day
724
Start Time
726
Category
728
...
Content Distribution System
706
Content Processing Application(s)
732
Broadcast Transmitter
730
EPG Application(s)
734
Stored On-Demand Content
744
Broadcast Network
710
736
Back Channel
744
708(1)
708(2)
708(N)
738(1)
738(2)
740
742

Fig. 7

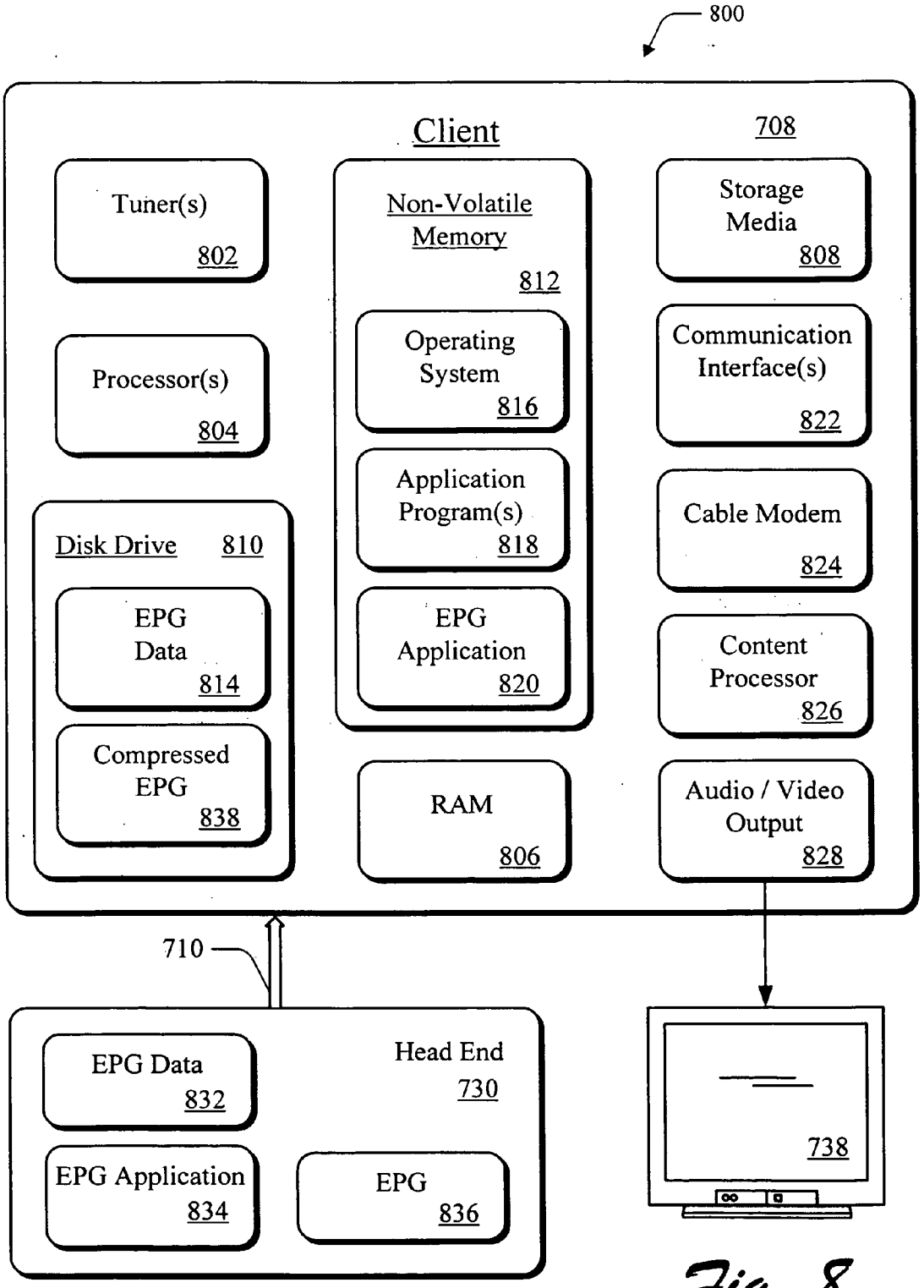

800
Client
708
Tuner(s)
802
Processor(s)
804
Disk Drive 810
EPG Data
814
Compressed EPG
838
Non-Volatile Memory
812
Operating System
816
Application Program(s)
818
EPG Application
820
RAM
806
Storage Media
808
Communication Interface(s)
822
Cable Modem
824
Content Processor
826
Audio / Video Output
828
710
EPG Data
832
Head End
730
EPG Application
834
EPG
836
738

Fig. 8

CONTENT-PROGRESS INDICATOR FOR AN EPG

TECHNICAL FIELD

The present invention generally relates to electronic program guides and more particularly to a content-progress indicator for an EPG.

BACKGROUND

[0001] Viewers have access to an ever-increasing amount of television programming due to a growing variety of television programs and an increasing number of channels. Although the amount of television programming has increased, however, viewers may encounter difficulties in accessing desired television programs due to the quantity of available content.

[0002] An electronic program guide (EPG) may be supplied to improve the viewer's experience with television programs. The EPG may enable the viewer to observe a listing of television programs that are currently being streamed, as well as a listing of television programs that will be streamed in the future. Additionally, the EPG may allow the viewer to navigate to a television program from the EPG itself. To provide additional information to the viewer, the EPG may include one or more television program characteristics that describe a television program in the EPG. The television program characteristics may include title, start time, channel, duration, description of the television program, a rating for the television program (e.g., G, PG, PG13, R, etc.), the principle protagonist, and so on. Because of the quantity of additional information, however, the viewer may not be able to readily determine desired information about the content.

[0003] Therefore, there is a continuing need to improve an EPG for display of data to a viewer.

SUMMARY

[0004] A content-progress indicator for an EPG is described. The content-progress indicator may be included in a display of an EPG to indicate a current progress state of content that is available for output by a client, such as a set-top box. For example, the content-progress indicator may indicate the current progress state of content that is streamed by a content provider for output and/or recordation by the client. The content-progress indicator may indicate the current progress state through a pictorial representation that indicates elapsed time and time remaining relative to duration of a stream of the content.

[0005] In an implementation, a method includes generating an electronic program guide (EPG) from data describing a plurality of content items for streaming from a head end to a client. The EPG includes a display of a described content item and a pictorial representation of a current progress state in the streaming of each content item from the head end.

[0006] In an implementation, a user interface (UI) for output by a client and for display by a display device includes a plurality of representation of content items and at least one pictorial representation. Each representation of a content item is selectable by a user to navigate to a corresponding content item. Each content item has a duration when streamed for output by the client. The at least one pictorial representation corresponds to a respective content item and indicates a time remaining in the duration of the respective content item.

[0007] In an additional implementation, a client includes an input interface for receiving one or more of a plurality of content items, an output interface for providing an output to a display device, a processor, and memory. The memory is configured to maintain an EPG for output at the output interface. The EPG includes at least one content-progress indicator that corresponds to a respective one of the content items. Each content item has a duration when streamed for output at the output interface. The content-progress indicator is displayable as a pictorial representation indicating elapsed time and time remaining in the stream of the respective content item relative to duration of the stream of the respective content item.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. **1** is an illustration showing a television entertainment system that includes a publisher and a client.

[0009] FIG. **2** is an illustration of an exemplary implementation showing the client and an EPG server of FIG. **1** in greater detail.

[0010] FIG. **3** is an illustration of an exemplary display of an EPG generated from EPG data through execution of an EPG application by the client.

[0011] FIG. **4** is an illustration of a system in an exemplary implementation showing an EPG generated from EPG data which includes a plurality of content-progress indicators that describes receipt and recordation of content by the client.

[0012] FIG. **5** is an illustration of a system in an exemplary implementation showing an EPG generated from EPG data which includes a plurality of content-progress indicators that describes output of recorded content at the client.

[0013] FIG. **6** is a flow chart depicting a procedure in an exemplary implementation in which an EPG that describes a plurality of content items is generated by an EPG server and communicated to a client, the EPG includes a content-progress indicator for each content item.

[0014] FIG. **7** illustrates an exemplary television entertainment system that is an architecture in which generation of an EPG may be implemented.

[0015] FIG. **8** illustrates selected components of the television entertainment system of FIG. **7**, such as an exemplary client and a television.

[0016] The same reference numbers are utilized in instances in the discussion to reference like structures and components.

DETAILED DESCRIPTION

[0017] Overview

[0018] A content-progress indicator for an EPG is described. The content-progress indicator may be included in a display of an EPG to indicate a current progress state of content that is available for output. For example, the content-progress indicator may indicate the current progress state through display of a bar that indicates elapsed time and time remaining relative to duration of a stream of content. Thus, a viewer of the content-progress indicator may visually associate a relative progress state in the streaming of particular content items without engaging in "mental mathematics" in order to compute the state as previously required when viewing textual descriptions of duration, elapsed time, and so forth.

[0019] EPG data may be provided in television entertainment systems, such as interactive television networks, cable networks that utilize EPGs, and Web-enabled television networks. Clients in such systems range from full resource cli-

ents with substantial memory and processor resources (e.g., television enabled personal computers, television recorders equipped with hard disk) to low-resource clients with limited memory and/or processing resources (e.g., traditional set-top boxes). While aspects of the system and methods described below may be used in any of these systems and for any type of client, they are particularly well suited for systems with low-resource clients. Hence, portions of the following discussion describe the clients, EPG servers, and methods in the context of a low-resource environment. For example, display of the content-progress indicator may be beneficial on clients having display devices with limited resolutions in which a textual description of a current progress state would consume an overly large portion of the display and/or could not be displayed in a satisfactory manner.

[0020] In the following discussion, content items are described to reference particular portions of content that is streamed by a head end and/or output by a client, such as output from a recordation stored locally on the client. Content items may take a variety of forms, such as a television program, a movie, a trailer for the movie, video-on-demand, a portion of a broadcast (e.g., a segment in a news channel broadcast), a scene in a television program, and so forth. Thus, content items may be utilized to reference particular "parts" of content that is available for output by a client, and are not limited to "complete" content items, such as a television program, a movie, and so on.

[0021] Television Entertainment System

[0022] FIG. **1** is an illustration showing a television entertainment system **100** that includes a publisher **102** and a client **104**. The publisher **102** creates EPG data **106** for distribution to the client **104**. One example of a publisher **102** is Tribune Media Services of Chicago, Ill., which generates EPG data for interactive television networks. As used herein, EPG data refers to a type of data that might be used to construct an EPG. EPG data includes television program characteristics (characteristics) of television programs streamed by a content provider. The characteristics may include program titles, ratings, description, lead protagonist's name, year made, station call letters, time schedules, channel numbers, and so on. Each of the characteristics has a corresponding value, such as "Everybody Loves Raymond" for the characteristic "program title."

[0023] The EPG data **106** is transferred as an electronic file from the publisher **102** to an EPG provider **108**. As one example, the EPG data **106** is transferred using a file transfer protocol (FTP) over a TCP/IP network (e.g., Internet, Intranet, and so on) to the EPG provider **108**. The EPG data **106** is stored in an EPG database **110** at the EPG provider **108**.

[0024] The original version of the EPG data **106** contains all of the programming information for multiple days. An EPG server **112** resides at the EPG provider **108** to process the EPG data **106**. The EPG server **112** processes the EPG data **106** by executing an EPG application **114**. The processing involves one or more techniques to condition the EPG data **106** so that the client **104** may handle the EPG data **106** more effectively. For example, the client **104** may be configured as a low-resource client that is typically characterized as having limited memory and/or processing resources. Such a client **104** may not be able to store the entire original version of the EPG data **106**. With limited resources at the client **104**, the processes performed by executing the EPG application **114** by the EPG server **112** are helpful to precondition the EPG data **106** into a more suitable form for storage and processing at the client **104**.

[0025] Among other processes, the EPG server **112**, when executing the EPG application **114**, is configured to reduce the amount of EPG data **106** so that it can be stored at the client **104** even if the client **104** has limited resources. For example, the EPG server **112** may compress the EPG data **106** prior to its distribution by using the EPG application **114**. The EPG application **114** may be implemented as software that is used to compress the EPG data **106** for communication to the client **104**.

[0026] The EPG server **112** provides compressed EPG data **116** formed from the EPG data **106** to a head end **118** for storage in a database **120** of the head end **118**. Distribution from the head end **118** to the client **104** may be accommodated in a number of ways over a network **122**, including cable, RF, microwave, and satellite. For example, the network **122** may be configured as the Internet as illustrated in FIG. **1**. In another implementation, the network **122** may be configured as a broadcast network, further discussion of which may be found in relation to FIG. **7**. Although the head end **118** is illustrated as separate from the EPG provider **108**, the EPG provider **108** may also include the head end **118** and the EPG server **112**. Additionally, the EPG server **112** may be included as part of the publisher **102** that provides the EPG data **106**.

[0027] In the illustrated implementation, the client **104** is implemented as a set-top box **124** connected to a display device **126**. The client **104** is often equipped with sufficient processing and storage capabilities to store and run an operating system and a few programs. Examples of programs stored on the client **104** might include a Web browser, a personal scheduler, and so forth. Although the set-top box **124** is shown separately from the display device **126**, they may alternatively be built into the display device **126** as integral units, as described in relation to FIG. **7**. Furthermore, in other implementations,. the client **104** may be embodied as other devices capable of handling EPG data, such as a broadcast-enabled computer, an information appliance, or the like.

[0028] The client **104** may include an EPG application **128** that is used to interact with compressed EPG data **116** obtained from the EPG server **112**. For example, the EPG application **128** may be used to decompress the compressed EPG data **116** to construct an EPG, and so forth.

[0029] EPG data **106** stored at the EPG database **110** may include a variety of characteristics **130-136** that describe television programs. For example, the characteristics may include program title **130**, day **132** the television program is to be streamed (i.e. Sunday), duration **134** of the stream of the television program, start time **136** the television program, and so forth. Additionally, each of the characteristics **130-136** may have a plurality of values. For instance, television programs that are streamed by a content provider may have different values **138(1)**, . . . , **138(*n*)**, . . . **138**(N) for the duration **136** characteristic.

[0030] FIG. **2** is an illustration of an exemplary implementation **200** showing the client **104** and the EPG server **112** of FIG. **1** in greater detail. The EPG provider **108** includes the EPG server **112** and the EPG database **110**. The EPG server **112** includes a processor **202** and a memory **204**. The EPG application **114** is illustrated as being executed on the processor **202** and is storable in the memory **204**. The EPG application **114** may include a compression routine **206** to compress the EPG data **106** of FIG. **1** to form compressed EPG data for communication to the client **104**.

[0031] The client **104** includes a processor **208** and a memory **210**. The EPG application **130** is storable in the

memory **210** and is illustrated as being executed on the processor **208**. The EPG application **130** may include a decompression routine **212** that, when executed, decompresses compressed EPG data received from the EPG server **112**. The EPG application **130** may also include an EPG generation routine **214** that, when executed, is used to construct an EPG from EPG data received from the EPG provider **108** over the network **122**.

[0032] The client **104** further includes input and output interfaces **216**, **218**. The input interface **216** may be utilized to obtain data from over the network **122**, such as EPG data, content, and so forth. The output interface **218** may be utilized by the client **104** to provide an output for display on the display device **126**, such as content and/or an EPG generated from EPG data by the EPG application **130**.

[0033] The client **104** may also include digital video recorder (DVR) functionality. For instance, the client **104** may include a storage device **220** to record content received from the network **122** via the input interface **216** for output to and rendering by the display device **126**. The storage device **220** may be configured in a variety of ways, such as a hard disk drive, a removable computer-readable medium (e.g., a writable digital video disc), and so on. Although the storage device **220** is illustrated as separate from the memory **210**, the memory **210** and the storage device **220** may be combined. For example, the storage device **220** may be configured as a hard disk drive and the memory **210** may be configured as RAM, both the memory **210** and the storage device **220** may be configured as RAM, one or both of the memory **210** and the storage device **220** may be configured as removable memory, and so forth.

[0034] The client **104** also includes a timer **222**. Although the timer **222** is illustrated as separate from the processor **208** and memory **210**, the timer **222** may be implemented in software, hardware, or a combination thereof. The client **104** may query the timer **222** to determine a current time. The client **104** may also determine the current time from a time indicated by a timer **224** on the EPG server **112**. For example, the EPG server **112** may include periodic notifications of the current time based on the timer **224** that are communicated to the client **104** over the network **122**. In another example, the periodic notifications of the current time are broadcast in a signal from a head end.

[0035] The EPG application **130**, when executed, may execute the EPG generation routine **214** to generate an EPG from the EPG data in a variety of ways. As previously described, the EPG data (e.g., EPG data **106** of FIG. **1**) may include a variety of characteristics that describe content for output by the client **104**. The EPG generation routine **214** may format these characteristics into an EPG such that a viewer of the EPG may view relevant information regarding the content. For example, the EPG may include a content-progress indicator for one or more content items described in the EPG to pictorially represent the progress of an output of each such described content item. Additional discussion of generation of an EPG including content-progress indicators may be found in relation to FIG. **5**. Further discussion of the client **104** and the EPG provider **108** and EPG server **112** may be found in relation of FIGS. **7-8**.

[0036] Although the environment **100** of FIG. **1** and the system **200** of FIG. **2** were described as providing compressed EPG data **116** for use by the EPG application **130** to generate the EPG, the EPG may be generated in a variety of ways. For example, the EPG application **114** may be executed by the EPG server **112** to generate the EPG for communication to the client **104** over the network **122**.

[0037] Exemplary EPGs

[0038] FIG. **3** is an illustration of an exemplary display of an EPG **300** generated from EPG data through execution of the EPG application **130** of FIG. **2** by the client **104**. The EPG **300** utilizes a plurality of representations to describe content, which in this example is content that includes a plurality of television programs that are available for streaming from content providers. The EPG **300** may be output by the client **104** of FIG. **2** for rendering by the display device **126** such that a viewer views the EPG **300** that describes content that may be available for output by the client **104**.

[0039] The EPG **300**, for instance, may describe a plurality of channels **302-306** that provide respective television programs. Each of the channels **302-306** described by the EPG **300** includes additional information that describes television programs for streaming on the respective channels **302-306**. For example, channel **302** in the EPG includes a segment **308** which displays a start time for the television program (which is illustrated as "1:00") and the channel from which the television program is streamed (which is illustrated in segment **308** as "Channel One"). Channel **302** also includes a segment **310** which contains additional descriptive information relating to the television program, such as the television program title and a detailed textual description of the television program. Likewise, channels **304-306** include respective segments **312**, **314** which describe the start time and channels. Channels **304-306** also include respective segments **316**, **318** which include the title and detailed textual descriptions of respective television programs. Although title, start-time, and detailed textual descriptions have been described as examples of characteristics that may be utilized to describe content, a variety of characteristics may be included in an EPG. Such examples include a title, a story line, a description, a production credit, a critic's opinion, a review, a recommendation, a duration, a start time, a stop time, an elapsed time in the streaming of the content, a time remaining in the streaming of the content, a genre, a rating, a performer, a director, and any combination thereof.

[0040] The EPG **300** may also include a variety of other functionality. For example, the EPG **300** is illustrated as including a menu bar **320** to enable a user to navigate between functionality utilizing one or more of the input devices. The illustrated menu bar **320** has functionality including current program title **322**, audio functionality **324** such as closed captioning and stereo, recent channels **326**, favorite channels **328**, and tools **330**, such as options for arrangement, font selection, and so on. The EPG **300** may also include one or more advertisements **332** and a display of the current time **334** obtained from the timer **222** on the client **104** as shown in FIG. **2**, the timer **224** on the EPG server **112** of FIG. **2**, and so on.

[0041] The EPG **300**, when generated, provides a user interface (UI) that is configured to receive user inputs. For instance, a viewer may utilize an input device, such as a television remote control, to select one or more of the representations of the television program (e.g., portions **308-318**) on the EPG **300** to navigate to corresponding content. Thus, the viewer may view descriptive information to chose a television program and navigate to a chosen program by utilizing the EPG **300**. Content described by the EPG **300**, however, may have different durations, start times, and stop times. For example, television programs streamed on respective chan-

nels **302-306** are illustrated as starting at "1:00". Each television program, however, may have a different duration, e.g. a different amount of time taken when streamed by respect content providers. For instance, the television program corresponding to channel **302** has a one-hour duration, the television program corresponding to channel **304** has a half-hour duration, and the television program corresponding to channel **306** has a twenty-minute duration. As shown in the display of the current time **334**, fifteen minutes have elapsed since the start time of each of the television programs. Therefore, each television program is at different relative point in the streaming of the respective television program. For instance, one-quarter of the streaming of television program on channel **302** has elapsed, while one-half of the streaming of the television program on channel **304** has elapsed, and three-quarters of the streaming of the television program on channel **306** have elapsed.

[0042] To display the relative amounts of time that have elapsed and that remains in the streaming of the television programs, each of the channels **302-306** may include a respective content-progress indicator **336-340**. Each content-progress indicator **336-340** of FIG. **3** supplies a pictorial representation of the elapsed time and the time remaining relative to the duration of a respective stream of a television program. For example, content-progress indicator **336** is illustrated as a bar that represents the duration of the output of the respective television program on channel **302**, which in this instance is one hour. The content-progress indicator **336** includes an elapsed-time portion **342** which indicates a relative amount of time in the streaming of the television program that has elapsed in relation to the duration. The content-progress indicator **336** also includes a time-remaining portion **344** that indicates a relative amount of time that remains in the duration of the streaming of the television program. Likewise, content-progress indicators **338**, **340** include respective elapsed time portions **346**, **348** and respective time-remaining portions **350**, **352**. In this way, the content-progress indicators **336-340** supply a direct visual correlation to a viewer of the current output "position" in the duration of corresponding content.

[0043] In the EPG **300** of FIG. **3**, each of the content-progress indicators **336-340** has a uniform size such that relevant progress of television programs may be compared, one to another. For example, the duration described by the content-progress indicator **336** of the first channel is one hour while the duration described by the content-progress indicator **338** of channel **304** is thirty minutes. Therefore, a viewer is able to judge that although 15 minutes have elapsed from the start time of the respective television programs of both channels **302**, **304**, that one quarter of the duration for the television program of channel **302** has elapsed as opposed to one half of the duration of the television program of channel **304** by viewing the respective content-progress indicators. In another implementation, each content-progress indicator may also be configured to describe differences in duration, such as through different relative sizes of respective content-progress indicators, and so on.

[0044] Although a plurality of content-progress indicators **336-340** are shown, the EPG **300** may also be configured to include a single content-progress indicator. For example, the content-progress indicator may correspond to a currently selected content item in the EPG **300**. Additionally, although television programs that are streamed from a head end are described, one or more of the content-progress indicators **336-340** may also describe content that is stored in the storage device **220** of FIG. **2**. For instance, the EPG **300** may show a program that is stored on a hard drive as an entries in the grid of the EPG **300**, such as by giving locally recorded content items their own "channel". Therefore, the content-progress indicator may be displayed to show the user how much of each program has been viewed.

[0045] In this implementation, the content-progress indicators **336-340** are utilized to describe content that is available to the client **104** from a stream output by a content provider. The content-progress indicators may also be utilized to describe recordation of the content, further discussion of which may be found in relation to the following figure.

[0046] FIG. **4** is an illustration of a system **400** in an exemplary implementation showing an EPG **402** generated from EPG data which includes a plurality of content-progress indicators **404-408** that describes receipt and recordation of content by the client **104**. As previously described, the client **104** may include digital video recorder (DVR) functionality by utilizing the storage device **220** to record content streamed over the network **122**. The storage device **220** may be configured in a variety of ways, such as a hard disk drive, a removable computer-readable medium (e.g., a writable digital video disc), and so on. When recording content received from the network **122**, the content-progress indicators **410**, **412**, **414** for the respective channels **404**, **406**, **408** may be utilized to indicate a current progress state of content recordation.

[0047] The EPG **402**, for instance, may include segments **416**, **418**, **420** that include one or more frames taken from content on the respective channels **404**, **406**, **408**. For example, channel **404** includes a segment **416** having an image of a dog **422** taken from a television program on the channel **404** of a dog show. Likewise, channel **406** includes a segment **418** having an image of a shopping cart **424** taken from a television program on channel **406** for home shopping, and channel **408** includes a segment **420** having an image of a home **426** taken from a television program on channel **408** for home renovation. Each of the television programs on the respective channels **404-408** in FIG. **4** is being recorded in the storage device **220** on the client **104** for later viewing. **100461** Content-progress indicators **410-414** are illustrated as being overlaid over the images taken from respective content on the respective channels **404-408**. The content-progress indicators **410-414** may be utilized to show the progress in the recording of the content from the respective channels **404-408**. Content-progress indicator **410**, for instance, indicates that one-quarter of the television program from the channel **404** has been received at the input interface **216** and recorded on the storage device **220**. Content-progress indicator **412** indicates that one half of the television program from the channel **406** has been received and recorded on the storage device **220**. Content-progress indicator **414** indicates that three quarters of the television program from the channel **408** has been received and recorded on the storage device **220**. The content-progress indicators may also be utilized to describe output of recorded content from a storage device, further discussion of which may be found in relation to the following figure.

[0048] FIG. **5** is an illustration of a system **500** in an exemplary implementation showing an EPG **502** generated from EPG data which includes a plurality of content-progress indicators **504-510** that describes output of recorded content at the client **104**. As previously described, the client **104** may include a storage device **220** to record content streamed from

a content provider. The client **104** may also output content stored on computer-readable media, such as digital video discs (DVDs). In this implementation, an EPG **502** is illustrated in which the client **104** outputs a plurality of content available

[0049] The EPG **502**, for instance, may include first and second sections **504**, **506** for display of respective content **508**, **510**. The first and second sections **504**, **506** each include a respective content-progress indicator **512**, **514** that describes a portion of the respective content that was stored by the client **104**. For example, a viewer may have changed from viewing content recorded on a first channel corresponding to the first portion **504** to a second channel corresponding to the second portion **506**. The client **104** automatically switched the recording of the respective channels in response to a switch in channels made by the viewer such that the viewer may "pause" the output of the output of the channels by using a pause buffer. The client **104**, for example, may playback the content from the storage device **220**, starting at the pause event, while continuing to record the currently-streamed content in the storage device.

[0050] The content-progress indicators **512**, **514** may be configured to describe content that was recorded by the client **104** in the storage device **220**. For example, content-progress indicator **512** indicates start and stop times **516**, **518** as the beginning and ends of a display of a bar, thereby also indicating the duration of the streaming of the content. Content corresponding to the content-progress indicator **512** that was recorded during the duration is illustrated by a portion of the content-progress indicator illustrated as a block between arrows **520**, **522**. Thus, a viewer of the content-progress indicator may determine which portions of the content were recorded by the client **104**.

[0051] Additionally, the content-progress indicators **512**, **514** may be utilized by the viewer to select one of a plurality of the content **508**, **510** being output for concurrent display on the display device **126**. For example, the client **104** may output a plurality of streams of content from the storage device **220** and the user may select a desired one of the plurality of streams based on the respective content-progress indicators **512**, **514**. Thus, content-progress indicators may be utilized to describe portions of content recorded by the client **104**, select one of a plurality of concurrently displayed content **508**, **510**, describe an amount of streamed content recorded by the client **104** as described in relation to FIG. **4**, describe a point during the duration of an output of the content as described in relation to FIG. **3**, and so on.

[0052] Although the content-progress indicators have been illustrated as bars in FIGS. **3**, **4** and **5**, the content-progress indicators may be configured in a variety of ways. For example, content-progress indicators may be configured as one or more graphs (e.g., a pie-chart) in which a first portion describes elapsed time and the remaining portion described time remaining. The first portion and the remaining portion form a segment that indicates the duration of the broadcast of the content. In another example, the content-progress indicator may be configured as an hourglass, with the "top" portion indicating time remaining and the "bottom" portion indicating elapsed time.

[0053] Furthermore, although each of the implementations described the generation of the EPG by an EPG application that is executed on the client, the EPG may be generated by an EPG application that is executed elsewhere in an environment, such as the EPG application **114** of the EPG server **112** in the environment **100** of FIG. **1**. Further discussion of generation of an EPG is described in relation to FIG. **6**. pp Exemplary Procedure

[0054] The following discussion describes EPGs that may be implemented utilizing the previously described systems and devices. Aspects of each procedure may be implemented in hardware, firmware, or software, or a combination thereof. The procedure is shown as a set of blocks that specify operations performed by one or more devices.

[0055] FIG. **6** is a flow chart depicting a procedure **600** in an exemplary implementation in which an EPG that describes a plurality of content items is generated by an EPG server and communicated to a client, in which the EPG includes a content-progress indicator for each content item. At block **602**, an EPG provider receives EPG data from a publisher. At block **604**, the EPG data is examined to find a start time and a duration for each content item for streaming by a content provider. For example, the content provider may stream content as a broadcast of television shows, pay-per-view movies, and so forth. The EPG data includes a plurality of characteristics that describe the content items, such as a title, a story line, a description, a production credit, a critic's opinion, a review, a recommendation, a duration, a start time, a stop time, an elapsed time in the streaming of the content, a time remaining in the streaming of the content, a genre, a rating, a performer, a director, and any combination thereof. The EPG application of the EPG provider, when executed, locates the start time and the duration for each content item from the plurality of characteristics.

[0056] At block **606**, the EPG provider queries a timer to determine a current time. For example, the current time may be relative to the start time found during the examination (block **604**). At block **608**, the EPG application is executed to derive an elapsed time and a time remaining for each content item. For example, the EPG application, when executed, may compute the elapsed time for each content item from the current time and the respective start time. The EPG application may also compute the time remaining based on the duration and the elapsed time. A variety of other techniques may also be utilized to compute the elapsed time and the time remaining.

[0057] At block **610**, a content-progress indicator is configured to indicate the elapsed time, the time remaining, and the duration for each content item. For example, each content-progress indicator may include a segment that represents the duration of a respective content item. A portion of the segment may be utilized to indicate the elapsed time for the respective content time, while the remaining portion of the segment is utilized to indicate the time remaining to stream to the content. As previously described, the segment and portions may be configured in a variety of ways, such as a bar, a pie-chart, an hour glass, and so forth.

[0058] At block **612**, an EPG is generated by the EPG provider that includes a description and the content-progress indicator for each content item. The description of the respective item may include one or more of the characteristics as previously described in relation to block **604**, one or more frames of the content as shown in FIGS. **4** and **5**, and so forth. At block **614**, the EPG is communicated from the EPG provider to the client, such as over the Internet, broadcast using a carousel file system as described in relation to FIG. **7**, and so forth. At block **616**, the EPG is output by the client for rendering by a display device.

[0059] Exemplary Environment

[0060] FIG. **7** illustrates an exemplary television entertainment system **700** that is an architecture in which generation of an EPG may be implemented. System **700** facilitates distribution of content, such as television programming, and EPG data to multiple viewers, and includes components to further facilitate EPG generation. The system **700** includes one or more content providers **702**, one or more EPG providers **704**, a content distribution system **706**, and multiple clients **708**(**1**), **708**(**2**), . . . , **708**(N) coupled to the content distribution system **706** via a broadcast network **710**. The clients **708**(**1**)-**708**(N) and broadcast network **710** can either be the same as or different from the client **104** and network **122** shown in FIG. **1**.

[0061] Content provider **702** includes a content server **712** and stored television programming, such as content **714**. Content server **712** controls distribution of the stored content **714** from content provider **702** to the content distribution system **706**. Additionally, content server **712** controls distribution of live content (e.g., content that was not previously stored, such as live feeds) and/or content stored at other locations to the content distribution system **706**. EPG provider **704** includes an EPG database **716** and an EPG server **718**. The EPG database **716** stores electronic files of EPG data which are used to generate an EPG. The EPG provider **704** may also obtain EPG data from other sources, such as the publisher **102** shown in FIG. **1**. The EPG provider **704**, EPG database **716** and EPG server **718** can either be the same as or different from the EPG provider **108**, EPG database **110** and EPG server **112** shown in FIG. **1**.

[0062] An electronic file maintains EPG data **720** that may include a program title **722**, day(s) **724** to identify which days of the week the television program will be streamed, start time(s) **726** to identify a time that the television program will be streamed on the particular day or days of the week, and a category **728**. A category, which may be considered a type of characteristic, describes the genre of a television program and categorizes it as a particular television program type. For example, a television program can be categorized as a movie, a comedy, a sporting event, a news program, a sitcom, a talk show, or as any number of other category descriptions. EPG data **720** may also include program ratings, characters, descriptions, protagonist's name, station identifiers, channel identifiers, and other schedule information. Additionally, EPG data **720** may include video-on-demand information, such as movie schedules, as well as application information, such as for interactive games, and other programming information that may be of interest to a viewer.

[0063] The EPG server **718** processes the EPG data **720** prior to distribution to generate a published version of the EPG data which can contain programming information for all broadcast channels and on-demand content listings for one or more days. The processing may involve any number of techniques to reduce, modify, or enhance the EPG data **720**. Such processes might include selection of television programs, television program compression, format modification, and the like. The EPG server **718** controls distribution of the published version of the EPG data from EPG provider **704** to the content distribution system **706** using, for example, a file transfer protocol (FTP) over a TCP/IP network (e.g., Internet or Intranet). Further, the published version of the EPG data can be transmitted from EPG provider **704** via a satellite and the content distribution system **706** directly to a client **708**.

[0064] Content distribution system **706** includes a broadcast transmitter **730**, one or more content processing applications **732**, and may contain one or more EPG data processing applications **734**. Broadcast transmitter **730** broadcasts signals, such as cable television signals, across broadcast network **710**. Broadcast network **710** can include a cable television network, RF, microwave, satellite, and/or data network, such as the Internet, and may also include wired or wireless media using any broadcast format or broadcast protocol. Additionally, broadcast network **710** can be any type of network, using any type of network topology and any network communication protocol, and can be represented or otherwise implemented as a combination of two or more networks.

[0065] A content processing application **732** processes the content received from content provider **702** prior to transmitting the content across broadcast network **710**. Similarly, the EPG application **734** processes the EPG data received from EPG provider **704** prior to transmitting the EPG data across broadcast network **710**. A particular content processing application **732** may encode, or otherwise process, the received content into a format that is understood by the multiple clients **708**(**1**), **708**(**2**), . . . , **708**(N) coupled to broadcast network **710**. Although FIG. **7** shows a single content provider **702**, a single EPG provider **704**, and a single content distribution system **706**, exemplary system **700** can include any number of content providers and/or EPG data providers coupled to any number of content distribution systems.

[0066] Content distribution system **706** is representative of a head end that provides EPG data, as well as content, to multiple subscribers. The content distribution system **706** in other embodiments may include the EPG server **718**. Each content distribution system **706** may receive a slightly different version of the EPG data that takes into account different programming preferences and lineups. The EPG server **718** may create different versions of an EPG that includes those channels of relevance to respective head end services, and the content distribution system **706** transmits the EPG data to the multiple clients **708**(**1**), **708**(**2**), . . . , **708**(N). In one implementation, for example, content distribution system **706** utilizes a carousel file system to repeatedly broadcast the EPG data over an out-of-band (OOB) channel to the clients **708**. Alternatively, the multiple clients **708**(**1**), **708**(**2**), . . . , **708**(N) can receive standard, or uniform, EPG data and individually determine the EPG data to display based on the associated head end service.

[0067] Clients **708** can be implemented in a number of ways. For example, a client **708**(**1**) receives content broadcast from a satellite-based transmitter via a satellite dish **736**. Client **708**(**1**) is also referred to as a set-top box or a satellite receiving device. Client **708**(**1**) is coupled to a television **738**(**1**) for presenting the content received by the client (e.g., audio data and video data), as well as a graphical user interface. A particular client **708** can be coupled to any number of televisions **738** and/or similar devices that can be implemented to display or otherwise render content. Similarly, any number of clients **708** can be coupled to a single television **738**.

[0068] Client **708**(**2**) is also coupled to receive content broadcast from broadcast network **710** and provide the received content to associated television **738**(**2**). Client **708**(N) is an example of a combination television **740** and integrated set-top box **742**. In this example, the various components and functionality of the set-top box are integrated into the television, rather than using two separate devices. The

set-top box integrated into the television can receive broadcast signals via a satellite dish (similar to satellite dish **736**) and/or via broadcast network **710**. In alternate implementations, clients **708** may receive broadcast content via the Internet or any other broadcast medium, such as back channel **744** which can be implemented as an Internet protocol (IP) connection or as other protocol connections using a modem connection and conventional telephone line, for example. Further, back channel **744** provides an alternate communication link between each of the clients **708**, and between the clients **708** and the content distribution system **706**.

[0069] The exemplary system **700** also includes stored on-demand content **744**, such as Video On-Demand (VOD) movie content. The stored on-demand content can be viewed with a television **738** via a client **708** through an onscreen EPG, for example, and a viewer can enter instructions to stream a particular movie, or other stored content, to a corresponding client **708**.

[0070] Exemplary EPG Data System

[0071] FIG. **8** illustrates an exemplary EPG data system **800** that includes selected components of television system **700**, such as an exemplary client **708** and a television **738**. Client **708** includes components to generate and output the EPG in a television-based entertainment and information system. Client **708** can be implemented as a set-top box, a satellite receiver, a TV recorder with a hard disk, a digital video recorder (DVR) and playback system, a game console, an information appliance, and as any number of similar embodiments.

[0072] Client **708** includes one or more tuners **802** which are representative of one or more in-band tuners that tune to various frequencies or channels to receive television signals, as well as an out-of-band tuner that tunes to the broadcast channel over which the EPG data is broadcast to client **708**. The tuners **802** may or may not correspond to the input interface **216** of FIG. **2**. Client **708** also includes one or more processors **804** (e.g., microprocessors) which process various instructions to control the operation of client **708** and to communicate with other electronic and computing devices.

[0073] Client **708** can be implemented with one or more memory components, examples of which include a random access memory (RAM) **806**, mass storage media **808**, a disk drive **810**, and a non-volatile memory **812** (e.g., ROM, Flash, EPROM, EEPROM, etc.). The memory components (e.g., RAM **806**, storage media **808**, disk drive **810**, and non-volatile memory **812**) store various information and/or data such as received content, EPG data **814**, configuration information for client **708**, and/or graphical user interface information.

[0074] Alternative implementations of client **708** can include a range of processing and memory capabilities, and may include any number and different memory components than those illustrated in FIG. **8**. For example, full-resource clients can be implemented with substantial memory and processing resources, including the disk drive **810**. Low-resource clients, however, may have limited processing and memory capabilities, such as a limited amount of RAM **806** and limited processing capabilities of a processor **804**.

[0075] An operating system **816** and one or more application programs **818** can be stored in non-volatile memory **812** and executed on a processor **804** to provide a runtime environment. A runtime environment facilitates extensibility of client **708** by allowing various interfaces to be defined that, in turn, allow application programs **818** to interact with client **708**. The application programs **818** that may be implemented in client **708** can include a browser to browse the Web (e.g., "World Wide Web"), an email program to facilitate electronic mail, and so on.

[0076] An EPG application **820** is stored in memory **812** to process the EPG data **814** and generate an EPG. The EPG application **820** utilizes the EPG data **814** and enables a television viewer to navigate through an onscreen EPG and locate television shows, video on-demand movies, interactive game selections, and other media access information of interest to the viewer. With the EPG application **820**, the television viewer can look at schedules of current and future programming, set reminders for upcoming programs, and/or enter instructions to record one or more television shows or video on-demand movies.

[0077] Client **708** further includes one or more communication interfaces **822** and a PSTN, DSL, or cable modem **824**. A communication interface **822** can be implemented as a serial and/or parallel interface, as a wireless interface, and/or as any other type of network interface. A wireless interface enables client **708** to receive input commands and other information from a user-operated input device, such as from a remote control device or from another infrared (IR), 802.11, Bluetooth, or similar RF input device. Input devices can include a wireless keyboard or another handheld input device such as a personal digital assistant (PDA), handheld computer, wireless phone, or the like. A network interface and a serial and/or parallel interface enables client **708** to interact and communicate with other electronic and computing devices via various communication links. Modem **824** facilitates client **708** communication with other electronic and computing devices via a conventional telephone line, a DSL connection, or a cable modem.

[0078] Client **708** also includes a content processor and/or decoder **826** to process and decode broadcast video signals, such as NTSC, PAL, SECAM, or other television system analog video signals, as well as a DVB, ATSC, or other television system digital video signals. Content processor **826** can also include a video decoder and/or additional processors to receive, decode, and/or process video content received from content distribution system **706** (FIG. **7**) which is representative of a head end service that provides EPG data, as well as content, to multiple clients **708**. Content processor **826** can include an MPEG-2 or MPEG-4 (Moving Pictures Experts Group) decoder that decodes MPEG-encoded video content. MPEG supports a variety of audio/video formats, including legacy TV, HDTV (high-definition television), DVD (digital versatile disc), and five-channel surround sound.

[0079] Typically, video content includes video data and audio data that corresponds to the video data. Content processor **826** generates video and/or display content that is formatted for display on display device **738**, and generates decoded audio data that is formatted for output by an audio device, such as one or more speakers (not shown) in display device **738**. Content processor **826** can include a display controller (not shown) that processes the video and/or display content to display corresponding images on display device **738**. A display controller can include a microcontroller, integrated circuit, and/or similar video processing component to process the images. Client **708** also includes an audio and/or video output **828** that provides the video and/or display signals to television **738** or to other devices that process and/or display, or otherwise render, the audio and video data. It is to be noted that the systems and methods described herein can

be implemented for any type of encoding format as well as for data and/or content streams that are not encoded.

[0080] Although shown separately, some of the components of client **708** may be implemented in an application specific integrated circuit (ASIC). Additionally, a system bus (not shown) typically connects the various components within client **708**. A system bus can be implemented as one or more of any of several types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, or a local bus using any of a variety of bus architectures. By way of example, such architectures can include an Industry Standard Architecture (ISA) bus, a Micro Channel Architecture (MCA) bus, an Enhanced ISA (EISA) bus, a Video Electronics Standards Association (VESA) local bus, and a Peripheral Component Interconnects (PCI) bus also known as a Mezzanine bus.

[0081] The exemplary EPG data compression system **800** also includes a head end **830** as an implementation of content distribution system **706** (FIG. **7**) which is representative of a head end that provides EPG data **832**, as well as content, to client **708**. Head end **830** includes an EPG application **834** (e.g., an EPG data processing application **734** as shown in FIG. **7**) implemented to process EPG data **832** as well as implement the EPG data compression procedures described herein. For example, the EPG application **834**, when executed, may generate a communicate an EPG **836** to the client **708** over the network **730**.

[0082] The EPG application **834** can be implemented as a software component that executes on a processor and is stored in a non-volatile memory device in head end **830**. Although EPG application **834** is illustrated and described as a single application configured to perform several functions of EPG data compression, the EPG application **834** can be implemented as several component applications distributed to each perform one or more functions in a computing device, a digital video recorder system, a personal video recorder system, and/or any other television-based entertainment and information system.

[0083] The EPG application **834** generates the EPG **836**, including identifiers and values found in the EPG data **832**, as described in relation to FIG. **6**. The EPG **836** may be generated by the head end **830** with the EPG application **834** when the head end generates the EPG data for an arbitrary time period and compresses the EPG data for communication to the client **708** via broadcast network **710**. Client **708** may receive the EPG **836** from the head end **830** in a compressed format as compressed EPG **838** and store the compressed EPG **838** in the disk drive **810**. Although this example describes compressing the EPG **836** before transmitting to reduce transmission bandwidth, client **708** may also receive the EPG **836** in an uncompressed format, and then compress the EPG **836** as compressed EPG **838** to reduce the memory storage space needed to maintain, or otherwise store, the EPG **836**.

[0084] Although the invention has been described in language specific to structural features and/or methodological acts, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as exemplary forms of implementing the claimed invention.

What is claimed is:

1. A user interface (UI) for output by a client and for display by a display device, the UI comprising:
- a plurality of representations of content items, wherein:
  - each said representation is selectable by a user to navigate to a corresponding said content item; and
  - each said content item has a duration when streamed for output by the client; and
- at least one pictorial representation that:
  - corresponds to a respective said content item; and
  - indicates a time remaining in the duration of the respective said content item.

2. The UI as recited in claim **1**, wherein one or more said content items are stored in a storage device on the client.

3. The UI as recited in claim **1**, wherein one or more said content items are streamed from a head end.

4. The UI as recited in claim **1**, wherein:
- one said content item is stored in a stored device on the client;
- another said content item is streamed from a head end to the client.

5. The UI as recited in claim **1**, wherein:
- the pictorial representation is displayable as a segment indicating the duration; and
- the segment has a portion indicating an elapsed time and a portion indicating a time remaining in the output of the content.

6. The UI as recited in claim **1**, wherein:
- each said representation includes one or more frames of the respective said content item; and
- the pictorial representation is for display over the one or more frames.

7. The UI as recited in claim **1**, wherein the pictorial representation is for display adjacent to the corresponding said representation.

8. The UI as recited in claim **1**, wherein one or more said content items is a television program.

9. A set-top box comprising an EPG application having computer-executable instructions that, when executed, output the UI as described in claim **1**.

10. One or more computer-readable media comprising computer-executable instructions that, when executed on a computer, direct the computer to generate an EPG for output that describes a plurality of content items, wherein:
- the EPG includes a representation for each said content item; and
- at least one said representation has a corresponding pictorial representation that indicates elapsed time and time remaining in a stream, when output, of a respective said content item relative to a duration of the stream.

11. The one or more computer-readable media as described in claim **10**, wherein the pictorial representation is displayable as a segment that indicates the duration, the segment having a portion indicating the elapsed time and a remaining portion indicating the time remaining.

12. The one or more computer-readable media as described in claim **10**, wherein the representation is selectable by a user to navigate to a corresponding said content item.

13. The one or more computer-readable media as described in claim **10**, wherein:
- the representation includes one or more frames of the content; and
- the pictorial representation is for display over the one or more frames.

14. The one or more computer-readable media as described in claim **10**, wherein the pictorial representation is for display adjacent to the representation.

15. The one or more computer-readable media as described in claim **10**, wherein one or more said content items is a television program.

16. A method comprising generating:

an electronic program guide (EPG) from data describing a plurality of content items for streaming from a head end to a client; and

from the EPG:

a display of a described of each said content item; and

a pictorial representation of a current progress state in the streaming of each said content item from the head end.

17. The method as described in claim **16**, wherein the current progress state is elapsed time and time remaining in the streaming of the content item relative to duration in the streaming of the content item.

18. The method as described in claim **16**, wherein:

the pictorial representation is displayable as a segment indicating the duration of the streaming; and

the segment has a portion indicating an elapsed time in the streaming and a portion indicating a time remaining in the streaming.

19. The method as described in claim **16**, wherein:

the pictorial representation is displayable as a bar indicating the duration of the streaming; and

the bar has a first portion indicating an elapsed time in the streaming and a second portion indicating a time remaining in the streaming.

20. The method as described in claim **16**, wherein the description is selectable by a user to navigate to corresponding said content item.

21. The method as described in claim **16**, wherein:

the description includes one or more frames of the content item; and

the pictorial representation is for display over the one or more frames.

22. The method as described in claim **16**, wherein the pictorial representation is for display adjacent to the description.

23. The method as described in claim **16**, wherein the plurality of content items includes a television program.

24. The method as described in claim **16**, wherein EPG is further configured to display one or more characteristics of the plurality of content items selected from the group consisting of:

a title;

a story line;

a textual description;

a production credit;

a critic's opinion;

a review;

a recommendation;

a duration;

a start time;

a stop time;

an elapsed time in the output of the content;

a time remaining in the output of the content;

a genre;

a rating;

a performer;

a director; and

any combination thereof.

25. The method as described in claim **16**, wherein the generating further comprises:

determining a start time and a duration of the streaming from the EPG data;

querying a timer to determine a current time; and

configuring the pictorial representation based on the start time, the duration, and the current time.

26. The method as described in claim **16**, wherein:

the content is received at a client from the head end; and

the pictorial representation indicates the current progress state in recordation of the plurality of content at the client.

27. The method as described in claim **16**, wherein:

the generating is performed at the head-end; and

the method further comprises communicating the EPG from the head-end to a client.

28. The method as described in claim **16**, wherein the generating is performed by a client.

29. One or more computer-readable media comprising computer-executable instructions that, when executed, perform the method as recited in claim **16**.

30. A method comprising:

receiving a plurality of content items described in an electronic program guide (EPG) and available for streaming from a head end to a client; and

generating a pictorial representation quantifying a current progress available for streaming of at least one said content item from the head end.

31. The method as described in claim **30**, wherein the pictorial representation quantifies how much of the at least one said content item has and has not been streamed from the head end.

32. The method as described in claim **30**, wherein:

at least one said content item is a TV program for playback at the client; and

the pictorial representation quantifies a time remaining for display of the TV program.

33. One or more computer-readable media comprising computer-executable instructions that, when executed, perform the method as recited in claim **30**.

34. A client comprising:

an input interface for receiving one or more of a plurality of content items;

an output interface for providing an output to a display device;

a processor; and

memory configured to maintain an EPG for output at the output interface, wherein the EPG includes at least one content-progress indicator that:

corresponds to a respective one of a plurality of content items, wherein each said content item has a duration when streamed for output at the output interface; and

is displayable as a pictorial representation indicating elapsed time and time remaining in the stream of the respective one said content item relative to duration of the stream of the respective one said content item.

35. The client as described in claim **34**, wherein the memory is further configured to maintain the content.

36. The client as described in claim **34**, wherein:

the content item is broadcast; and

the input interface is a tuner for receiving the broadcast content item over the network and the EPG from a carousel file system.

37. The client as described in claim **34**, wherein the network is an Internet.

38. The client as described in claim **34**, wherein the pictorial representation is displayable as a segment representing the duration, the segment having a portion indicating the elapsed time and a portion indicating the time remaining.

39. An apparatus comprising:

means for generating an electronic program guide (EPG) from data describing a plurality of content items, the EPG including a description of each said content item; and

means for generating a pictorial quantification of a remainder of at least one said content item that is available for streaming from a head end to the client.

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