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G06F 17/30

(52) UK CL (Edition W):
G4A AUDB AUXX

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WO 2002/032025 A1 **US 6286034 B1**
US 6108706 A

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(54) Abstract Title: **A Method of Announcing Sessions**

(57) An electronic service guide (ESG) is provided by transmitting announcements describing multimedia sessions, such video streams. Sessions are organised into a session directory (28) which is split into two parts: a full session directory (29_1) and an updated session directory (29_2). A first kind of announcement describes all sessions in the full session directory. A second kind of announcement describes sessions in the updated session directory. Once a client has received a description of the full session directory, it need only listen to announcements of the second type so as to learn of any updates to sessions.

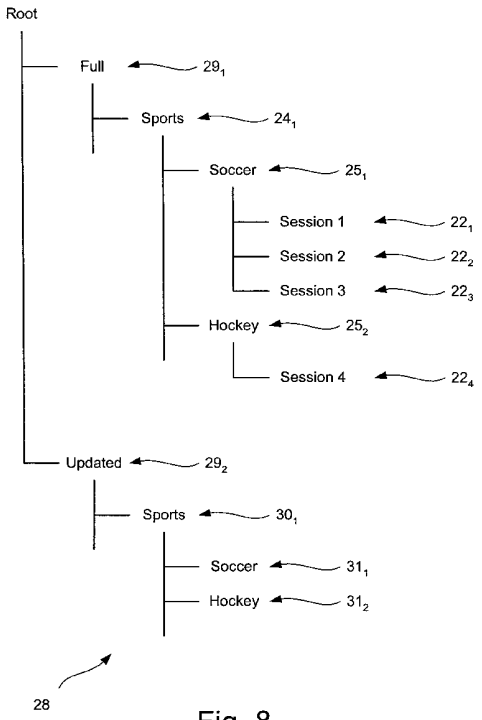

Fig. 8

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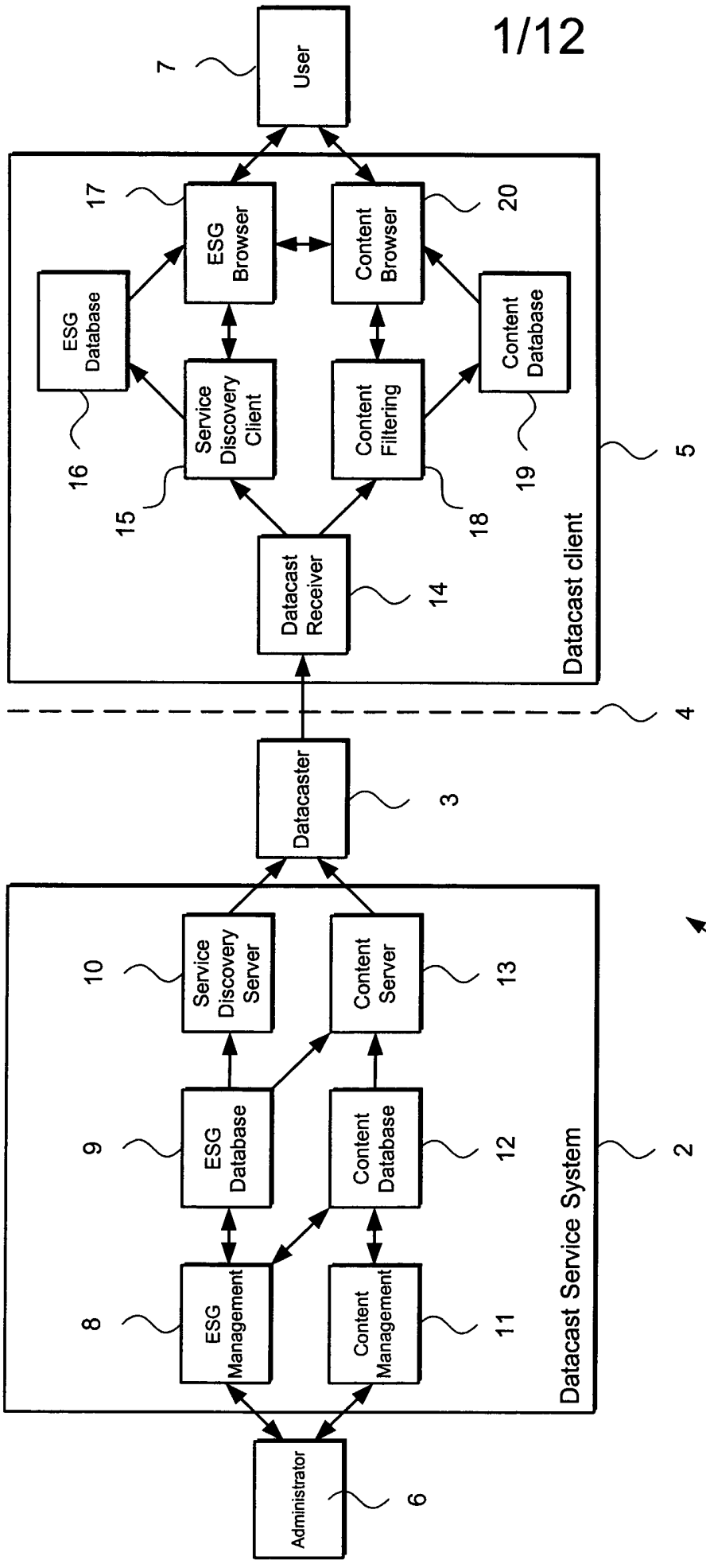
User
7
ESG Browser
17
Content Browser
20
ESG Database
16
Service Discovery Client
15
Content Filtering
18
Content Database
19
Datacast Receiver
14
Datacast client
5
4
Datacaster
3
Service Discovery Server
10
Content Server
13
ESG Database
9
Content Database
12
ESG Management
8
Content Management
11
Datacast Service System
2
1
Administrator
6

Fig. 1

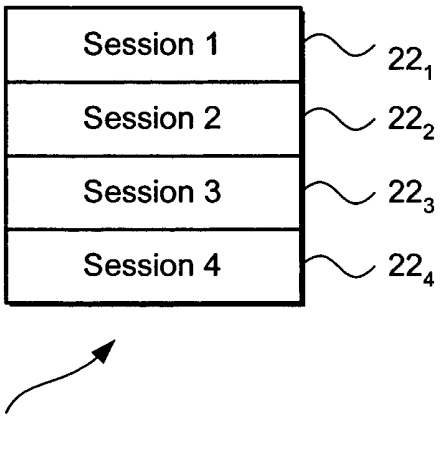

Fig. 2

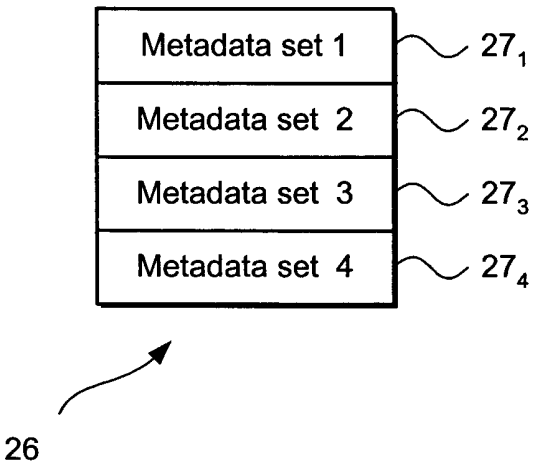

Fig. 4

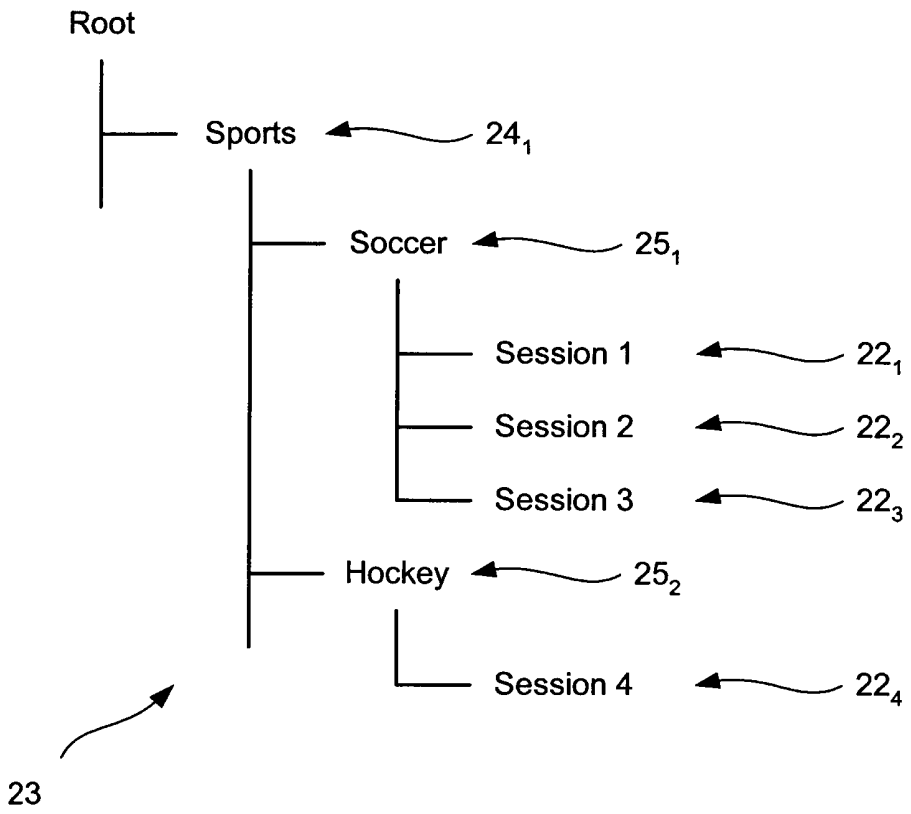

Fig. 3

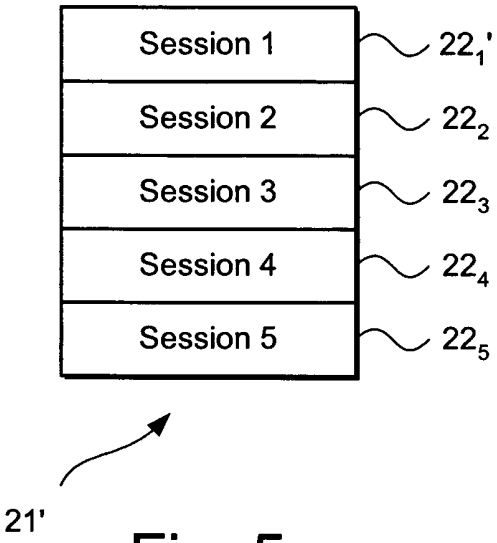

Fig. 5

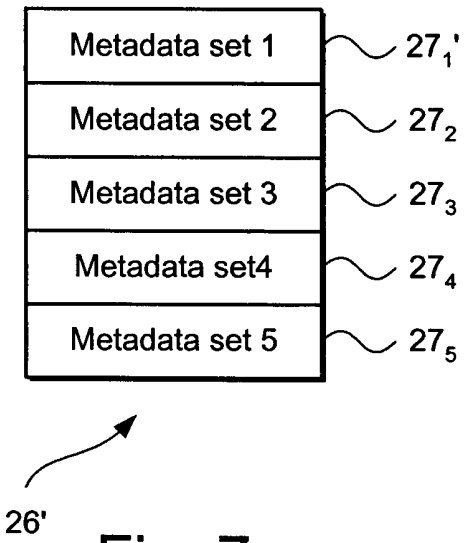

Fig. 7

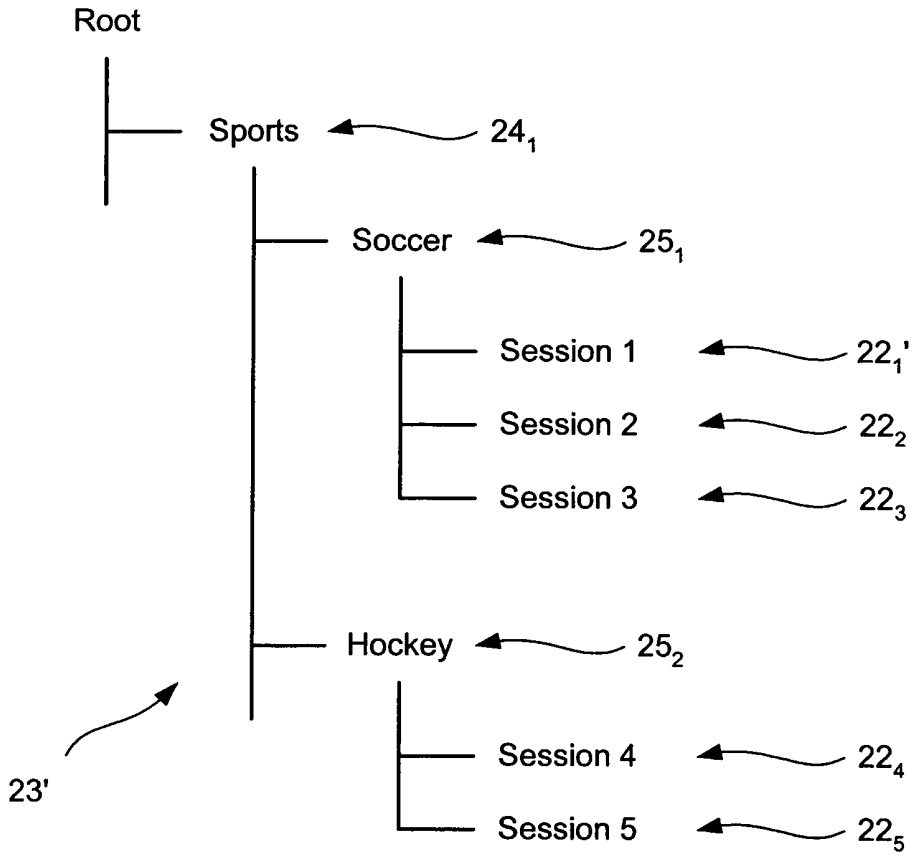

Fig. 6

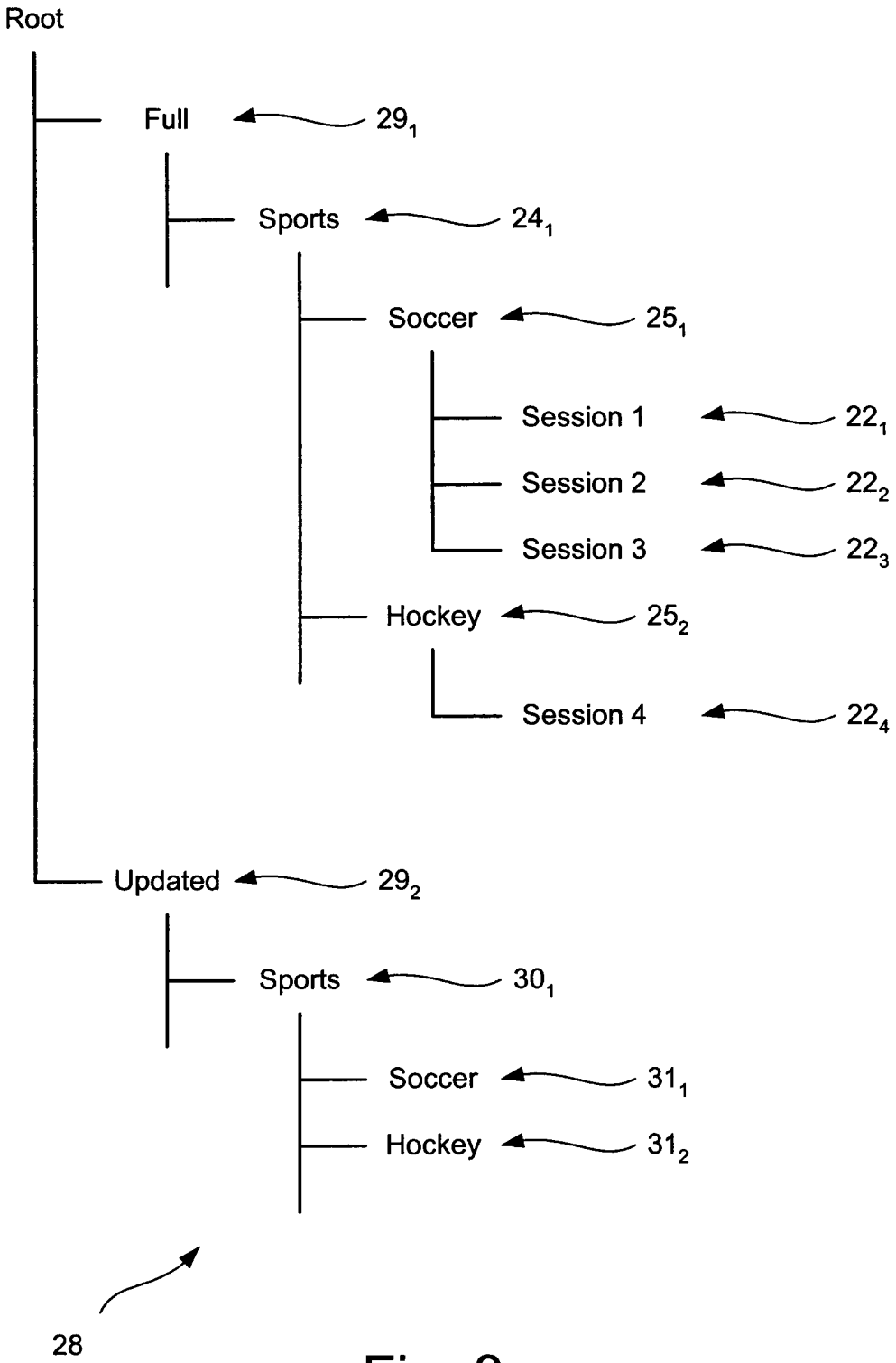
Root
Full
29_1
Sports
24_1
Soccer
25_1
Session 1
22_1
Session 2
22_2
Session 3
22_3
Hockey
25_2
Session 4
22_4
Updated
29_2
Sports
30_1
Soccer
31_1
Hockey
31_2
28

Fig. 8

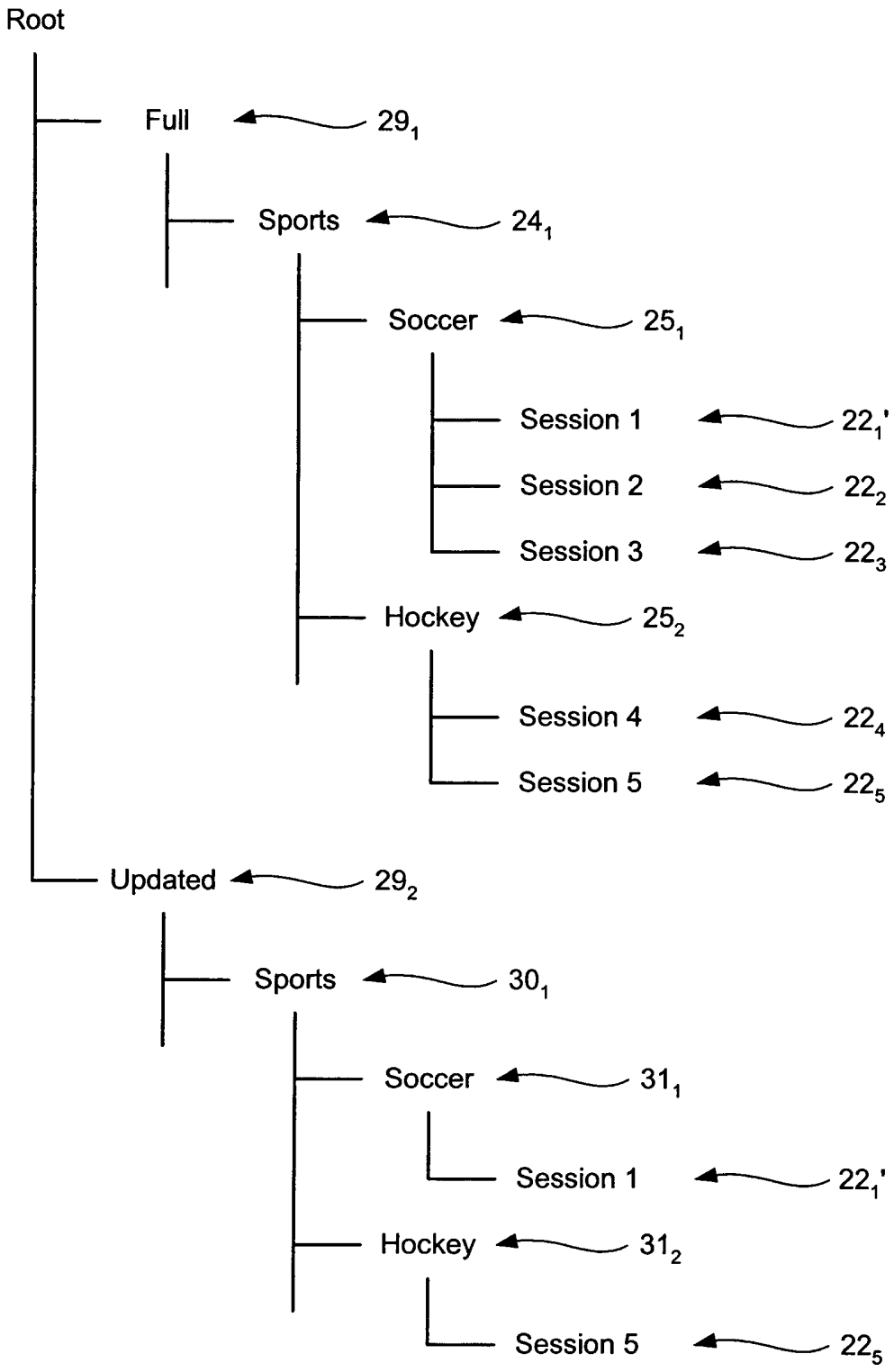
Root
Full
29_1
Sports
24_1
Soccer
25_1
Session 1
$22_1'$
Session 2
22_2
Session 3
22_3
Hockey
25_2
Session 4
22_4
Session 5
22_5
Updated
29_2
Sports
30_1
Soccer
31_1
Session 1
$22_1'$
Hockey
31_2
Session 5
22_5
28'

Fig. 9

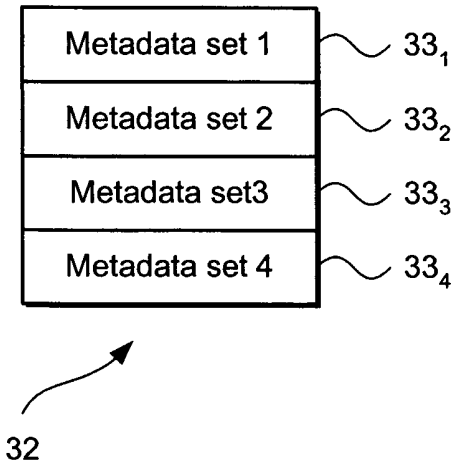

Fig. 10

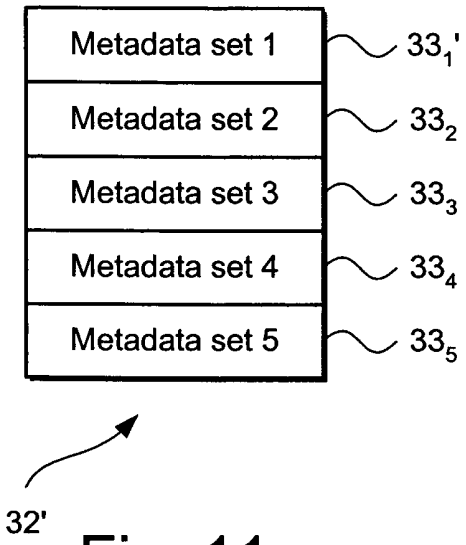

Fig. 11

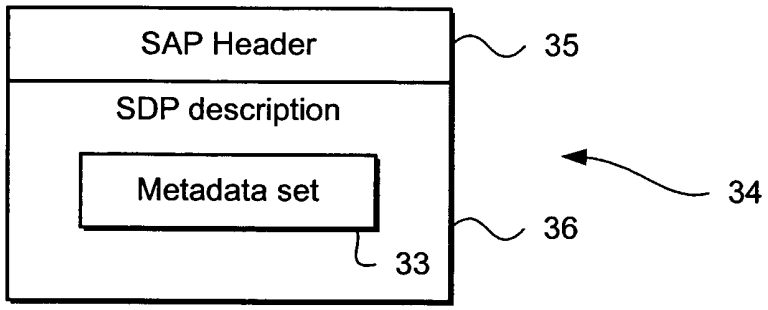

Fig. 12

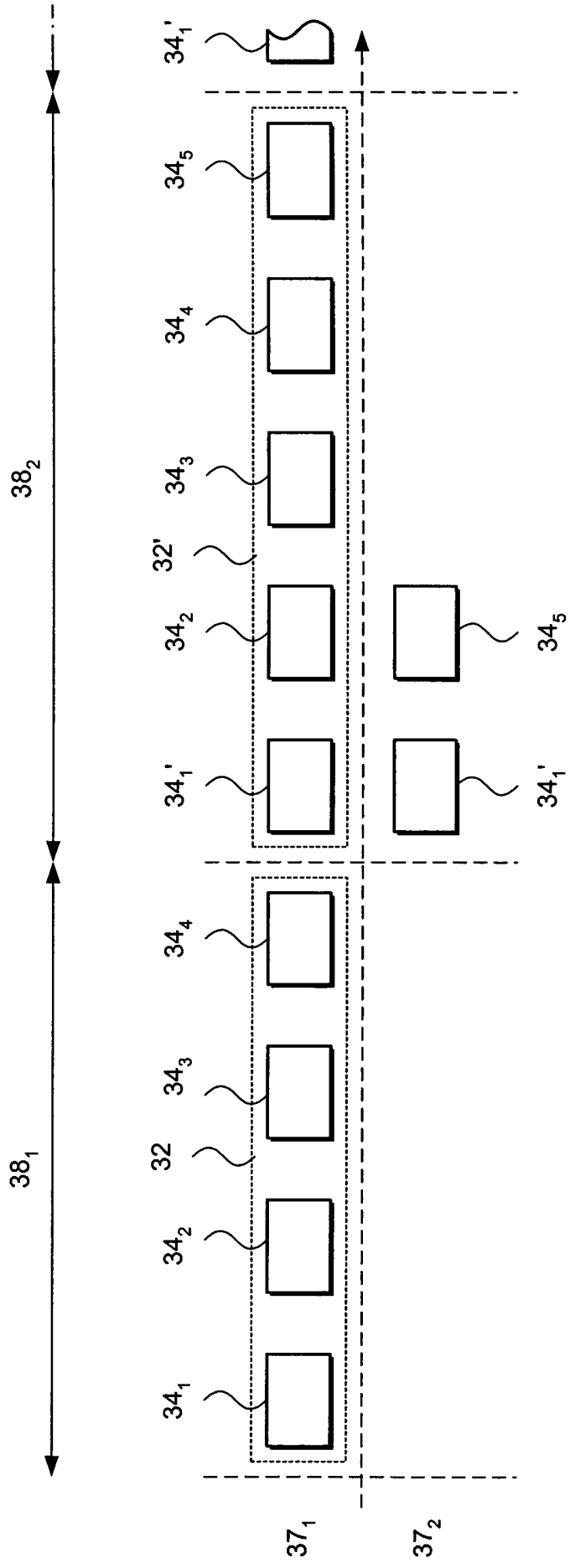
38_2
38_1
$34_1'$
34_5
34_4
34_3
32'
34_2
$34_1'$
34_5
$34_1'$
34_4
34_3
32
34_2
34_1
37_1
37_2
time

Fig. 13

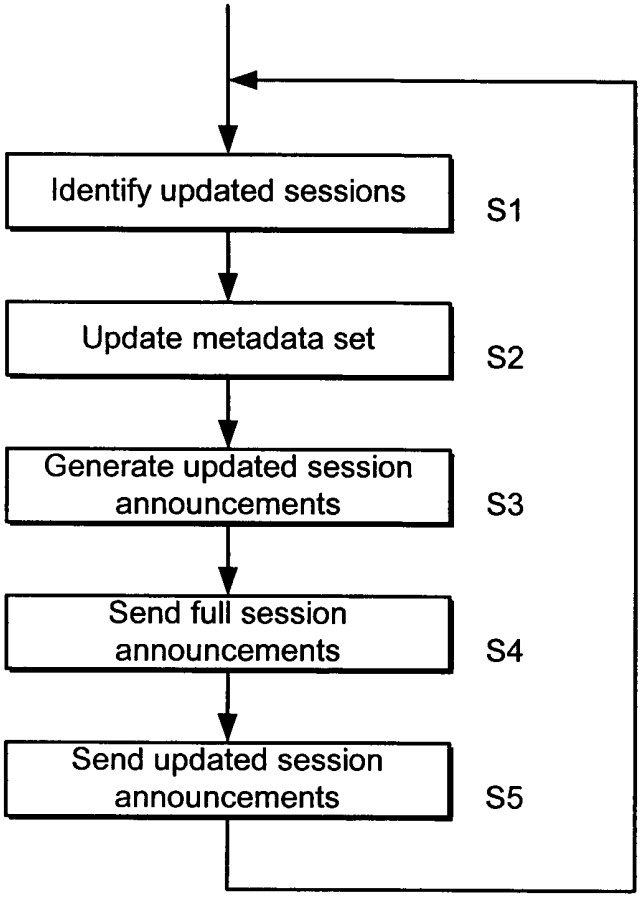
Identify updated sessions
S1
Update metadata set
S2
Generate updated session announcements
S3
Send full session announcements
S4
Send updated session announcements
S5

Fig. 14

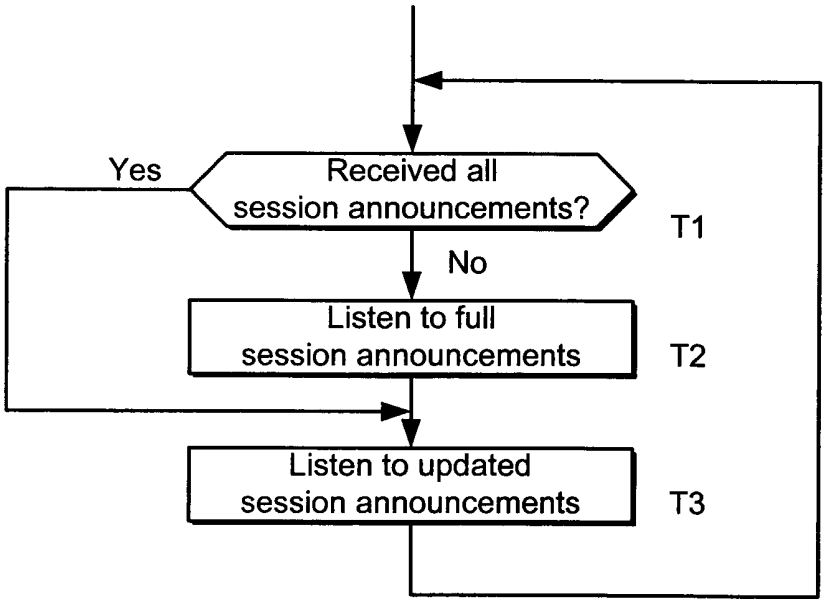
Yes
Received all session announcements?
T1
No
Listen to full session announcements
T2
Listen to updated session announcements
T3

Fig. 15

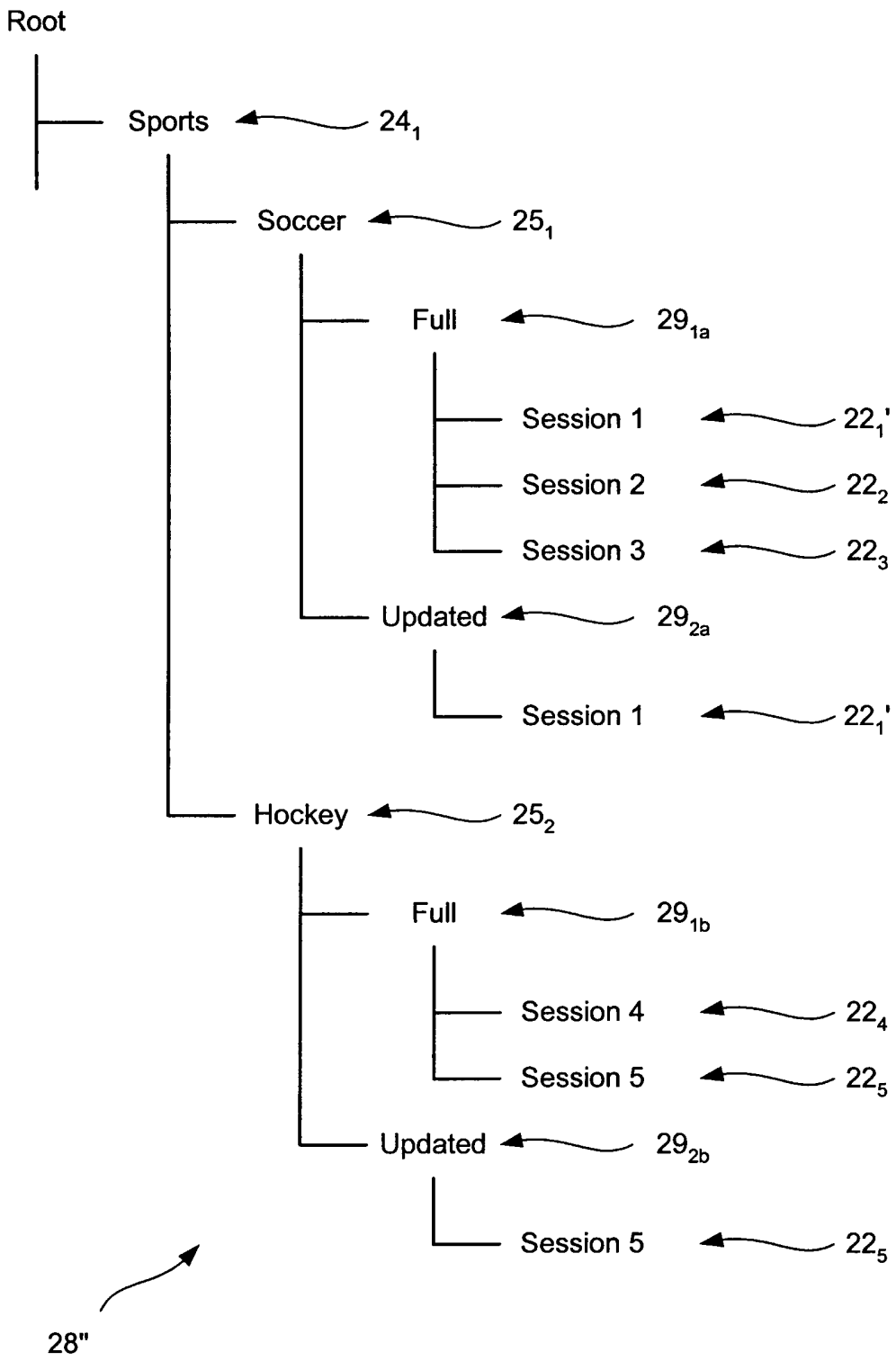
Root
Sports
24_1
Soccer
25_1
Full
29_{1a}
Session 1
$22_1'$
Session 2
22_2
Session 3
22_3
Updated
29_{2a}
Session 1
$22_1'$
Hockey
25_2
Full
29_{1b}
Session 4
22_4
Session 5
22_5
Updated
29_{2b}
Session 5
22_5
28"

Fig. 16

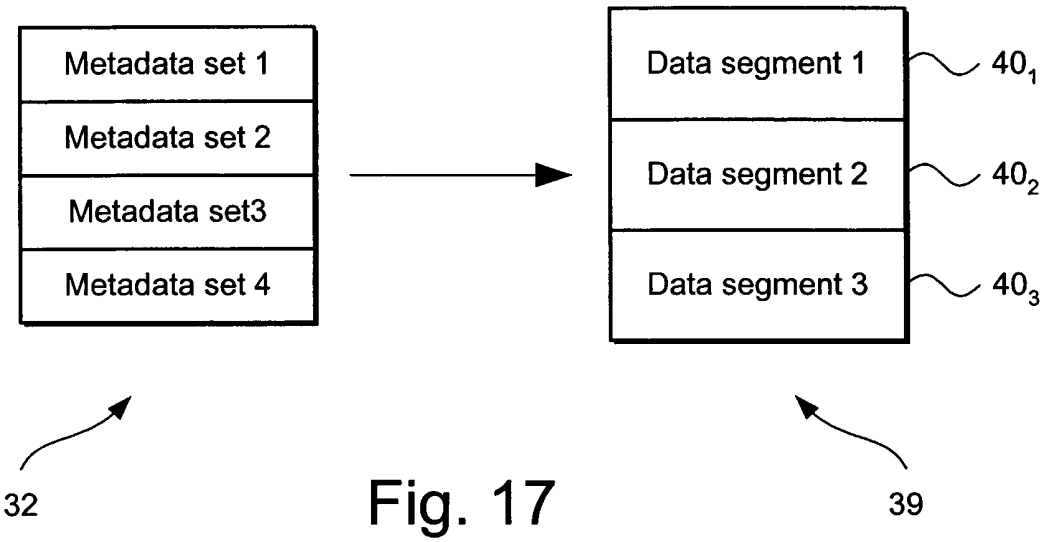
Metadata set 1
Metadata set 2
Metadata set3
Metadata set 4
Data segment 1
Data segment 2
Data segment 3
40_1
40_2
40_3
32
39

Fig. 17

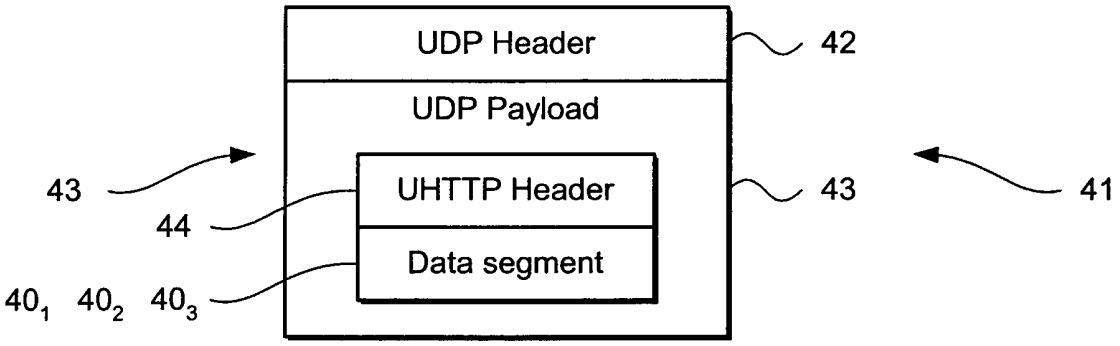
UDP Header
UDP Payload
UHTTP Header
Data segment
42
43
43
41
44
40_1 40_2 40_3

Fig. 18

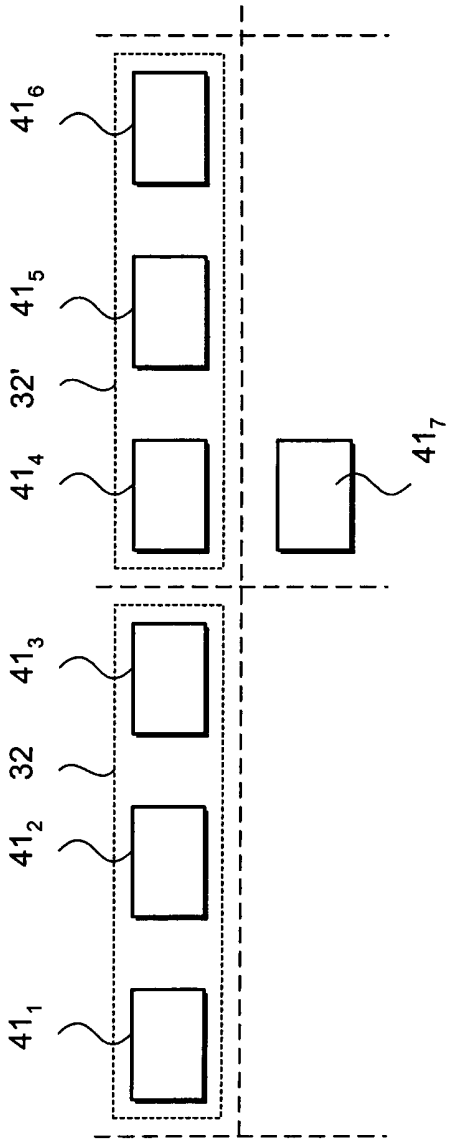
41_1
41_2
32
41_3
41_4
32'
41_5
41_6
41_7

Fig. 19

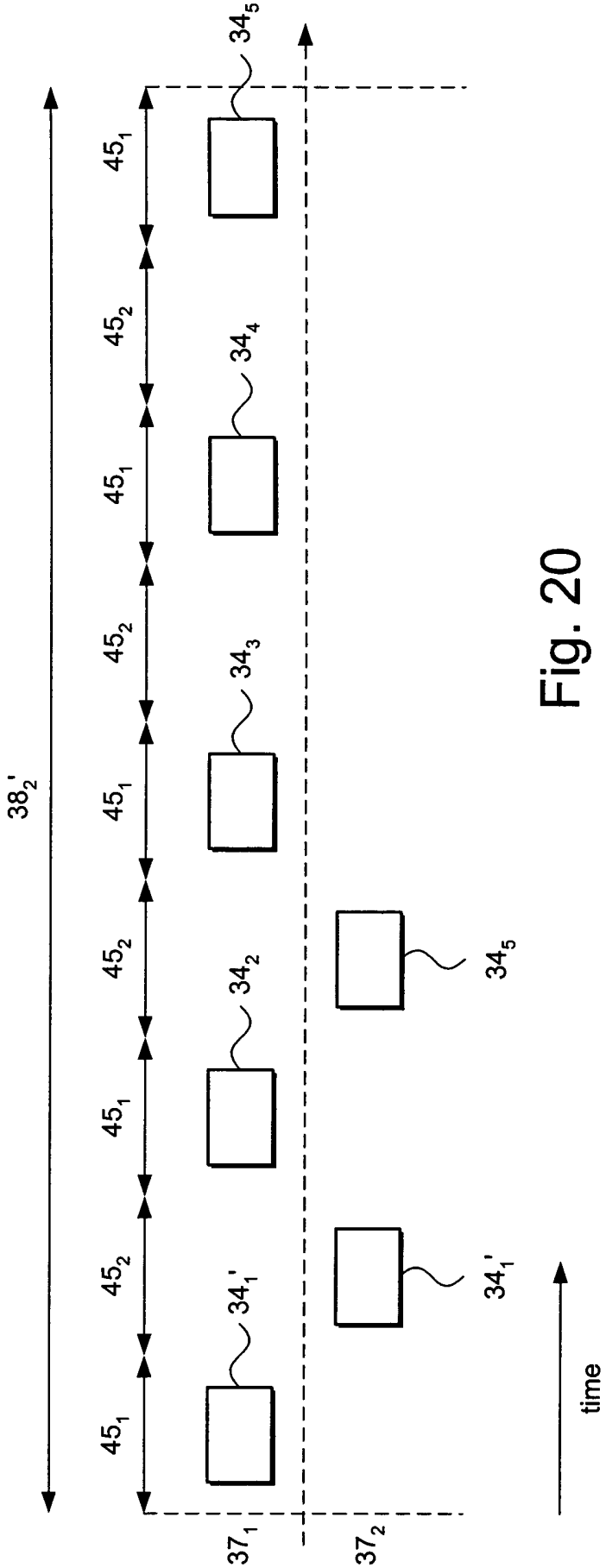
$38_2'$
45_1
45_2
45_1
45_2
45_1
45_2
45_1
$34_1'$
34_2
34_3
34_4
34_5
$34_1'$
34_5
37_1
37_2
time

Fig. 20

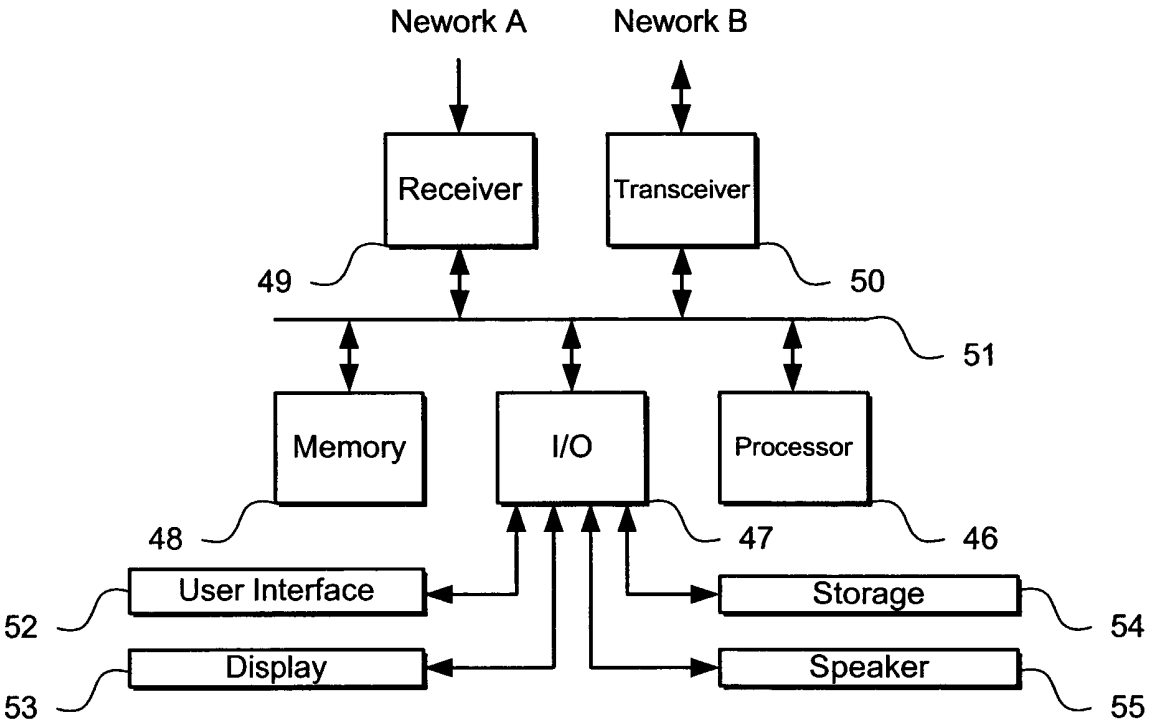
Nework A
Nework B
Receiver
Transceiver
49
50
51
Memory
I/O
Processor
48
47
46
User Interface
Storage
52
54
Display
Speaker
53
55

Fig. 21

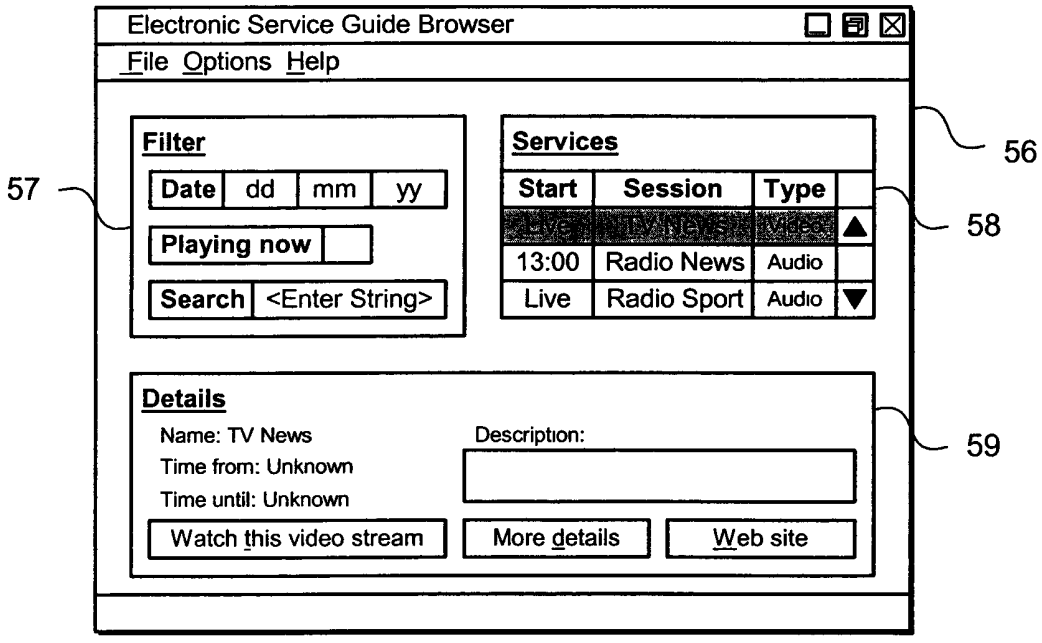
Electronic Service Guide Browser
File Options Help
Filter
Date dd mm yy
Playing now
Search <Enter String>
Services
Start Session Type
13:00 Radio News Audio
Live Radio Sport Audio
Details
Name: TV News
Time from: Unknown
Time until: Unknown
Description:
Watch this video stream
More details
Web site
56
57
58
59

Fig. 22

2396444

Method of announcing sessions

Description

The present invention relates to a method of announcing sessions particularly, although not exclusively to a method of announcing multimedia service sessions through a multicast network.

Audio, video and other types of data may be transmitted through a variety of types of network according to many different protocols. For example, data can be transmitted through a collection of networks usually referred to as the "Internet" using protocols of the Internet protocol suite, such as Internet Protocol (IP) and User Datagram Protocol (UDP).

Data is often transmitted through the Internet addressed to a single user. However, it can be addressed to a group of users. This is known as "multicasting".

One way of multicasting data is to use an IP datacasting network, similar to a terrestrial digital video broadcasting (DVB-T) network. Through such an IP-based broadcasting network, one or more service providers can supply different types of IP services including on-line newspapers, radio, television and download of music songs, videos, pictures and software. These IP services are organised into sessions, each session comprising one or more media streams in the form of audio, video and/or other types of data.

To determine when and where these sessions occur, users refer to an electronic service guide (ESG), similar to an electronic program guide (EPG) used in DVB. The electronic service guide is usually divided up into parts and transmitted to users.

This approach, however, has several drawbacks. On the one hand, if any sessions are updated, then the user usually has to wait until a new version of the service guide has been received before they receive notification of updated sessions. On the other hand, few sessions are usually updated. Therefore, much of the data

received by the user is superfluous. This is wasteful both in terms of processing power and electrical power, both of which tend to be in short supply in battery-powered mobile terminals.

The present invention seeks to provide an improved method of announcing sessions transmitted through a network.

According to a first aspect of the present invention there is provided a method of announcing sessions transmitted through a network, the method comprising providing a first set of announcements describing a plurality of sessions and providing a second set of announcements describing at least one updated session.

This has the advantage that it is possible to choose whether to be provided with the first set of announcements describing the plurality of sessions or to be provided with the second set of announcements describing any updated sessions. This allows updated sessions to be announced more quickly and efficiently.

An updated session may be a new session which is added to the plurality of sessions, a one of the plurality of sessions in which content is added, changed or delete or a session which is deleted from the plurality of sessions.

Providing the first set of announcements and providing the second set of announcements may comprises providing the first set of announcements through a first channel and providing the second set of announcements through a second, different channel.

Providing the first set of announcements and providing the second set of announcements may comprise providing the first set of announcements through a first address, preferably a destination address, such as a first multicast IP address, and providing the second set of announcements through a second, different address, preferably a destination address, for example a second, different multicast IP address, respectively.

Providing the first set of announcements and providing the second set of announcements may comprise providing the first set of announcements through a first port number and providing the second set of announcements through a second, different port number respectively.

Providing the first set of announcements and providing the second set of announcements may comprise providing the first set of announcements through a first logical channel and providing the second set of announcements through a second, different logical channel respectively.

Providing the first set of announcements and providing the second set of announcements may comprise including in each announcement of the first set of announcements data for identifying the announcement as an announcement which describes a one of the plurality of sessions and in each announcement of the second set of announcements data for identifying the announcement as an announcement which describes a one of the at least one updated session.

Providing the first set of announcements and providing the second set of announcements may comprise including in each announcement of the first set of announcements respective data for specifying a position of a corresponding session within a first portion of a session directory and including in each announcement of the second set of announcements respective data for specifying a position of a corresponding session within a second portion of the session directory.

Providing the first set of announcements and providing the second set of announcements may comprise providing the first set of announcements through a first physical channel and providing the second set of announcements through a second, different physical channel respectively.

Providing the first set of announcements and providing the second set of announcements may comprise providing the first set of announcements through a first network and providing the second set of announcements through a second, different network respectively.

The method may further comprise providing a third set of announcements describing another plurality of sessions including the at least one updated session.

The method may comprise providing the first set of announcements through a first channel, providing the second set of announcements describing at least one updated session through a second, different channel and providing a third set of announcements describing another plurality of sessions including the at least one updated session through the first channel.

The method may comprise arranging the providing of said second set of announcements after the providing of said first set of announcements.

The method may comprise arranging the providing of said first set of announcements and the providing of said third set of announcements at substantially during an overlapping or same time periods.

Providing the first set of announcements and providing the second set of announcements may comprise transmitting the first set of announcements through the first channel and transmitting the second set of announcements through the second, different channel.

The method may comprise transmitting the first set of announcements according to a session announcement protocol (SAP), unidirectional hypertext transfer protocol (UHTTP), asynchronous layered coding (ALC) protocol or similar unidirectional protocol based on user datagram protocol (UDP). The method may comprise including a description of a corresponding session in each announcement, for example arranged according to session description protocol (SDP).

The method may comprise providing means for determining whether all of the first set of announcements have been provided, for example by providing the first set of announcements as a series of linked messages.

The method may comprise providing the first set of announcements in a first set of time slots and providing the second set of announcements in a second set of time slots, each timeslot of the first set of timeslots being provided at a different time from each timeslot of the second set of timeslots. The method may comprise multiplexing the first and second sets of announcements.

According to a second aspect of the present invention there is provided a computer program which, when executed by data processing apparatus, causes the data processing apparatus to perform a method of announcing sessions transmitted through a network.

According to a third aspect of the present invention there is provided a method of accessing sessions transmitted through a network, the method comprising selectively receiving a first set of announcements describing a plurality of sessions; and selectively receiving a second set of announcements describing at least one updated session.

The method may further comprise determining whether all of said first set of announcements have been received. The method may further comprise selecting not to receive further said first set of announcements and selecting to receive said second set of announcements. The method may further comprise selecting not to receive a third set of announcements describing another plurality of sessions including said at least one updated session. The method may further comprise selecting to receive a fourth set of announcements describing at least one further updated session.

According to a fourth aspect of the present invention there is provided a method of accessing sessions transmitted through a network, the method comprising listening to a first set of announcements describing a plurality of sessions, determining whether said first set of announcements have been received; if said first set of announcements have been received, then stopping listening to said first set of announcements and listening to a second set of announcements describing at least one updated session.

The method may further comprise stopping listening to a third set of announcements describing a further plurality of sessions including said at least one updated session.

According to a fifth aspect of the present invention there is provided apparatus for announcing sessions transmitted through a network, the apparatus comprising means for providing a first set of announcements describing a plurality of sessions and means for providing a second set of announcements describing at least one updated session.

According to a sixth aspect of the present invention there is provided apparatus for performing the method.

According to a seventh aspect of the present invention there is provided apparatus for announcing sessions transmitted through a network, the apparatus comprising a first transmitter for providing a first set of announcements describing a plurality of sessions and a second transmitter for providing a second set of announcements describing at least one updated session.

The apparatus may comprise means for managing an electronic service guide for announcing sessions to be transmitted through the network, means for managing content of sessions to be transmitted through the network, means for storing and electronic service guide for announcing sessions to be transmitted through the network, means for storing content of sessions to be transmitted through the network, means for determining changes to an electronic service guide, the changes corresponding to updated sessions to be transmitted through the network, a server for providing information relating to changes to an electronic service guide, the changes corresponding to updated sessions to be transmitted through the network, a server for providing content and/or means for transmitting data.

According to an eighth aspect of the present invention there is provided apparatus for accessing sessions transmitted through a network, the apparatus comprising

means for selectively receiving a first set of announcements describing a plurality of sessions and means for selectively receiving a second set of announcements describing at least one updated session.

The apparatus may comprise means for determining whether said first set of announcements has been received the apparatus being configured such that if the determining means determines that the first set of announcements has been received, then the means for selectively receiving said second set of announcements is configured to receive the second set of announcements.

The apparatus may comprise means for selectively receiving a third set of announcements describing another plurality of session including the at least one updated session, the apparatus being configured such that if said determining means determines that the first set of announcements has been received, then the means for selectively receiving the third set of announcements is configured not to receive or not to forward the third set of announcements

The apparatus may comprise means for receiving data, means for filtering an electronic service guide for announcing sessions to be transmitted through the network, means for storing an electronic service guide for announcing sessions to be transmitted through the network, means for browsing an electronic service guide for announcing sessions to be transmitted through the network, means for filtering content, means for storing content and/or means for browsing content.

The apparatus may be a mobile communications device.

According to a ninth aspect of the present invention there is provided a system for presenting program schedule data on a display, said system comprising at least two announcements, the schedule data being organized at least partly from a first set of announcements describing at least partly a plurality of sessions and at least partly from a second set of announcements describing at least one at least partly updated session.

According to an tenth aspect of the present invention there is provided a system for presenting program schedule data on a display, said system comprising at least two announcements, the schedule data being organized at least partly from a first set of repeatable announcements describing a plurality of sessions, at least partly from a second set of repeatable announcements describing at least one at least partly updated session and at least session descriptions of at least one of the repeatable announcements for defining whether the at least one of the first and second announcements is received or not.

According to a eleventh aspect of the present invention there is provided a system for delivering program schedule data to end-user terminals, said system comprising two sets of announcements, each set comprising at least one announcement, the schedule data being organized at least partly from a first set of announcements describing at least partly a plurality of sessions and at least partly from a second set of announcements describing at least one at least partly updated session.

According to a twelfth aspect of the present invention there is provided a system for presenting program schedule data to end-user terminals, said system comprising at least two set of announcements, each set comprising at least one announcement, the schedule data being organized at least partly from a first set of repeatable announcements describing a plurality of sessions, at least partly from a second set of repeatable announcements describing at least one at least partly updated session and at least session descriptions of at least one of the repeatable announcements for defining whether the at least one of the first and second announcements is received or not.

The second set of announcements may include a version number of each updated session for allowing a client to detect if they have missed an earlier update. If a client detects it has missed an earlier update and is not currently receiving the first set of announcements, the client may start receiving the first set of announcements until it has received a full and latest version of the program schedule data. If the client detects that it has received a full and latest version of the program schedule data, it may stop receiving the first set of announcements and continues receiving

only the second set of announcements. If the client detects it has missed an earlier update, it may fetch a full and latest version of the program schedule data over an interactive network. Each set of repeatable announcements may be divided into segments before transmission and a location of each segment within a whole transfer may be indicated in a framing field of each respective segment; the indicated location may enable clients to determine whether they have received all segments that constitute a given set or whether they need to wait for receiving more segments.

The program schedule data may be viewed either directly by a human end-user or automatically used by a software application. The program schedule data may be presented progressively to a human end-user or made progressively available to an automatic software application as the said data is being received. The program schedule data may be viewed by a human end-user via a graphical user interface. The program schedule data may be used by a personal video recorder.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a schematic diagram of a multicasting system 1;

Figure 2 shows content stored in a content database;

Figure 3 shows a session directory;

Figure 4 shows electronic service guide data stored in an electronic service guide database;

Figure 5 shows updated content stored in a content database;

Figure 6 shows an updated session directory;

Figure 7 shows updated electronic service guide data stored in an in an electronic service guide database;

Figure 8 shows a first example of an improved session directory before an update;

Figure 9 shows the session directory shown in Figure 8 after the update;

Figure 10 shows electronic service guide data before an update;

Figure 11 shows electronic service guide data after an update;

Figure 12 shows a session announcement message using SAP and SDP protocols;

Figure 13 illustrates transmission of a description of an improved session directory using session announcement messages shown in Figure 12;

Figure 14 is a process flow of a method of operating a datacast service system;

Figure 15 is a process flow of a method of operating a datacast client;

Figure 16 shows a second example of an improved session directory after an update;

Figure 17 shows splitting electronic service guide data into data segments;

Figure 18 another session announcement message using UDP and UHTTP protocols;

Figure 19 illustrates transmission of a description of an improved session directory using session announcement messages shown in Figure 18;

Figure 20 shows transmission of a description of an improved session directory using session announcement messages using time division multiplexing;

Figure 21 shows a schematic diagram of a terminal used to receive multicast data and

Figure 22 shows an electronic service guide browser.

Multicasting system 1

Referring to Figure 1, a multicasting system 1 is shown. In this example, the multicasting system 1 is an internet protocol (IP) datacast system. The multicasting system 1 includes a datacast service system 2, a datacaster 3, a datacast network 4 and a plurality of clients 5. For clarity, only one client 5 is shown.

An administrator 6 provides content, such as audio, video and/or other types of data, for datacasting to clients 5 and provides metadata for describing the content. The metadata includes information regarding transmission of content.

The datacast service system 2 generates IP streams carrying content items and related metadata for datacasting to clients 5. The datacaster 3 receives IP streams from the datacast service system 2, provides Layer 2 encapsulation and modulation and transmits the IP data to clients 5 over the datacast network 4. The datacast network 4 is a point-to-multipoint network for delivering IP-based data. Typically, the datacast network 4 supports a plurality of simultaneous datacasts to clients 5. In this example, the datacast network 4 does not provide a return data path from the

client 5 to the datacaster 3. The datacast network 5 may be for example a Digital Video Broadcasting (DVB) network, a Digital Audio Broadcasting (DAB) network, an Advanced Television Systems Committee (ATSC) network, an Integrated Services Digital Broadcasting (ISDB) network or a Wireless Local Area Network (WLAN). The client 5 comprises a terminal for receiving content and content descriptions over the datacast network 4 and presenting them to an end-user 7. The terminal may be fixed, such as a desk-top personal computer or a television set-top box, or portable, for instance a lap-top or notebook personal computer, personal digital assistant or mobile telephone handset.

The datacast service system 2 includes an electronic service guide (ESG) management module 8, a content management module 9, an ESG database 10 for storing metadata for the electronic service guide, a contents database 11 for storing content for datacasting, a service discovery server 12 and a content server 13.

The ESG management module 8 allows the administrator 6 to control metadata for describing datacast content. Content items can be grouped into IP services and IP sessions. Content items can be allocated (or de-allocated) time slots for transmission. Thus, the metadata describes the structure of content items as a hierarchy of IP services and IP sessions. The metadata may also include information on the transmission schedule of IP sessions and individual content items within IP sessions.

The content management module 11 allows the administrator 6 to add, replace and delete content items in the content database 12.

The service discovery server 10 generates announcements of IP services and IP sessions based on the metadata found in the ESG database 9. The announcements are sent to the datacaster 3 for transmission over the datacast network 4.

As will be explained in more detail later, two kinds of announcements are generated. A first kind of announcement describes a full IP service directory and a second kind of announcement describes updates to the IP service directory.

The content server 13 retrieves scheduling information from the ESG database 9 and, based on the scheduling information, retrieves content from the content database 11 and sends it to the datacaster 3 for transmission over the datacast network 4.

The client 5 includes a datacast receiver 14, a service discovery client 15, an ESG database 16 for storing metadata for the electronic service guide, an ESG browser 17, a content filtering application 18, a content database 19 and a content browser 20.

The datacast receiver 14 receives data over the datacast network 4 whereupon it demodulates and decapsulates the data. In this case, the datacast receiver 14 forwards the demodulated and decapsulated data to an IP stack (not shown). The demodulated and decapsulated data comprises IP packets carrying content streams or metadata describing content. The IP packets are forwarded from the stack (not shown) to IP-based applications 15, 18 running on the client 5.

The service discovery client 15 receives the IP packets on one or more given addresses and one or more given ports for carrying IP service announcements. As will be explained in more detail later, the service discovery client 15 can receive announcements of the first type describing the full service directory and, either alternatively or additionally, announcements of the second type describing updates to service directory. The IP packets carry metadata which can be stored in the ESG database 16 or forwarded directly to the ESG browser 17.

The ESG database 16 has an information structure very similar to the server-side ESG database 9. The ESG database 16 is initially empty, for example when the client 5 is first switched on, but fills up and is updated as IP session announcements are received from the datacast service system 2.

The ESG browser 17 allows the end-user 7 to view schedules and descriptions of IP services, sessions and content items available from the datacaster service system 2.

The ESG browser 17 can retrieve metadata from the ESG database 16 or receive metadata directly from the service discovery client 15.

The content filtering application 18 receives the IP packets on one or more given addresses and one or more given ports configured by the content browser 20 or other applications running on the client. The IP packets carry content which can be stored in the content database 19 or forwarded directly to the content browser 20.

The content browser 20 is loaded and run when the end-user 7 has selected a particular datacast content item for consumption. The content item can be received in real time or retrieved from the content database 19. The content browser 20 can be for example a Web browser, an MP3 player or a streaming video client.

The multicasting system 1 may allow automatic content uploading by external content providers (not shown) and forwarding of Internet-based content. The datacaster 3 can also deliver content to a plurality of datacast networks (not shown), each datacast network comprising one or more transponders.

Sessions

Referring to Figure 2, content 21 is shown which is stored in the content database 11 and which includes first, second, third and fourth sessions 22_1, 22_2, 22_3, 23_4. The first, second and third sessions 22_1, 22_2, 22_3 comprise data relating to soccer. For example, the first session 22_1 may include text relating a game, the second session 22_2 include video streaming and the third session may include audio streaming 22_3. The fourth session 22_4 comprises data relating to hockey. A session 22_1, 22_2, 22_3, 23_4 may comprise a single IP stream or a plurality of IP streams.

Session Directory

Referring to Figure 3, a session directory 23 is shown according to which the sessions 22_1, 22_2, 22_3, 22_4 are organised. The session directory 23 includes, at a first level, categories such as sports 24_1. Further examples of categories include arts, business, computers, games, news and shopping and other categories which are commonly found on web portal sites. Each category includes, at a second level,

sub-categories, such as soccer 25_1 and hockey 25_2. Each sub-category may be further sub-divided. For instance, the soccer sub-category 25_1 can be divided into soccer leagues, each of which may be divided into league divisions and each of which in turn may be divided into players.

Each category, sub-category or further sub-category may include one or more sessions. For example, the soccer sub-category 25_1 includes the first, second and third sessions 22_1, 22_2, 22_3, while the hockey sub-category category 25_2 includes the fourth session 22_4.

Referring to Figure 4, ESG data 26 is shown which is stored in the ESG database 9. The electronic service guide data 26 includes first, second, third and fourth sets of metadata 27_1, 27_2, 27_3, 27_4 for describing the first, second, third and fourth sessions 22_1, 22_2, 22_3, 22_4 respectively. The ESG data 26 reflects the structure of the session directory 22.

The ESG data 26 is transmitted to clients 5 so as to provide an ESG for users. However, there is a problem if the ESG data 26 needs to be updated, as will now be explained:

Referring to Figures 1, 2, 3 and 4, initially, ESG data 26 is transmitted from the datacast service system 2 to the client 5. The datacast service system 2 sends sets of metadata 27_1, 27_2, 27_3, 27_4 to the datacaster 3 to be transmitted to clients 5. The client 5 begins to receive the sets of metadata 27_1, 27_2, 27_3, 27_4 and starts to fill the initially empty ESG database 16. Eventually, all the sets of metadata 27_1, 27_2, 27_3, 27_4 are received and are stored in the ESG database 16. At this point, the ESG is complete.

Referring to Figure 5, the content database 12 is updated and corresponding updated content 21' is shown. The updated content 21' includes an updated session 21_1' and a new session 21_5. For example, the first session 21_1 may be updated by replacing a match preview with a match report. The new session 21_5 may be a text file with a hockey fixture list.

Referring to Figure 6, an updated session directory 23' is shown and includes the updated session 21_1' and the new session 21_5.

Referring to Figure 7, an updated ESG data 26' is shown including an updated first sets of metadata 27_1, and a new set of metadata 27_5.

Referring to Figures 1, 4, 6 and 7, the updated ESG data 26' is transmitted from the datacast service system 2 to the client 5. The datacast service system 2 sends the updated ESG data 26' to the datacaster 3 for transmission. The client 5 then receives updated sets of metadata 27_1', 27_2, 27_3, 27_4, 27_5. However, the client 5 does not know whether each set of metadata 27_1', 27_2, 27_3, 27_4, 27_5 relates to existing or updated sessions. Thus, each incoming set of metadata 27_1', 27_2, 27_3, 27_4, 27_5 is compared with stored sets of metadata 27_1, 27_2, 27_3, 27_4 to check whether they relate to an updated data session. Processing metadata in this way is wasteful. Furthermore, there can be delay between the first session 21_1 being updated and the electronic service guide at the client 5 being revised.

Therefore, it is desirable to provide an improved session directory and an improved ESG.

One solution to the problem is to split the session directory and divide transmission of the ESG accordingly. Description of the session directory is transmitted by sending two types of session announcements one for describing the full session directory and another for describing an updated session directory, as will now be described in more detail:

Split Session Directory – First Example

Referring to Figures 8 and 9, a first example of an improved session directory 28, 28' is shown before and after an update respectively.

The session directory 28, 28' is split into two parts at a relatively high level, in this example above the category level, and the two parts are referred to as the full

session directory 29_1 and the updated session directory 29_2 respectively. Later, in a second example, a session directory is described which is split at a relatively low level.

The full session directory 29_1 includes substantially the same categories described earlier, such as sports 24_1. Each category includes sub-categories, such as soccer 25_1 and hockey 25_2. Similarly, there may be further sub-categories. Each category, sub-category or any further sub-category may include one or more sessions. In this case, the soccer sub-category 25_1 includes the first, second and third sessions 22_1, 22_2, 22_3 and the hockey sub-category category 25_2 includes the fourth sessions 22_4.

The updated session directory 29_2 also includes categories which correspond to the categories in the full session directory, such as sports 30_1. Similarly, each corresponding category includes corresponding sub-categories, such as soccer 31_1 and hockey 31_2. Similarly, there may be corresponding further sub-categories. Each corresponding category, corresponding sub-category or any corresponding further sub-category may include, if there has been an update, one or more updated sessions.

Before the update, the updated session directory 29_2 does not list any sessions.

After the update, the updated directory 29_2 lists updated sessions. In this case, the soccer sub-category 31_1 includes the updated, first session 22_1' and the hockey sub-category category 31_2 includes the fifth session 22_5.

This configuration is used to send two types of session announcements. One type of announcement is used to describe all sessions. Another type of announcement is used to describe updated sessions.

Thus, the client may listen initially to announcements of the fist type so as to receive a description of all the sessions, i.e. the full session directory. Once the client has received the description of all sessions, the client may listen only to announcements of the second type so as to learn of any updates to the sessions.

Session Announcements using SAP and SDP

Referring to Figures 10 and 11, a first example of improved ESG data 32, 32' is shown before and after the update.

The improved ESG data 32 includes first, second, third and fourth sets of metadata 33_1, 33_2, 33_3, 33_4 for describing the first, second, third and fourth sessions 22_1, 22_2, 22_3, 22_4 respectively.

The updated, improved ESG 32' includes the updated first, second, third, fourth and fifth sets of metadata 33_1', 33_2, 33_3, 33_4, 33_5 for describing the updated first, second, third, fourth and fifth sessions 22_1', 22_2, 22_3, 22_4, 22_5 respectively.

A Session Announcement Protocol (SAP) is used to transmit sets of metadata 33_1, 33_1', 33_2, 33_3, 33_4, 33_5 to clients 5 and a Session Description Protocol (SDP) is used to describe the sessions 21_1, 22_1', 22_2, 22_3, 22_4, 22_5. Reference is made to "Session Announcement Protocol" by M. P. Maher, C. Perkins & E. Whelan, RFC 2974, IETF, October 2000 and to "Session Description Protocol" by M. Handley & V. Jacobson, RFC 2327, IETF, April 1998.

The use of the Session Announcement Protocol and the Session Description Protocol advantageously permits information describing the structure of session directories to be transmitted to clients 5. Reference is made to "Describing session directories in SDP" by R. Finlayson, Internet Draft, IETF, January 2001 and "Towards multicast session directory services" by A. Santos, J. Macedo & V. Freitas.

Referring to Figure 12, a session announcement 34 is shown. The session announcement 34 comprises an SAP header 35 and payload in the form of an SDP description 36 of a session. The SDP description 36 includes a set of metadata 33 for describing a session.

Referring to Figure 13, a description of the session directory 28 is transmitted by sending two types of session announcements 37_1, 37_2 each describing a session

directory, in this case the full session directory 29_1 and the updated session directory 29_2 respectively.

The first type of session announcements 37_1 is used to send descriptions of all sessions, i.e. the full session directory 29_1. During an earlier cycle 38_1, the announcements $34_1, 34_2, 34_3, 34_4$ describe all sessions $22_1, 22_2, 22_3, 22_4$ before the update and, during a later cycle 38_2, the announcements $34_1', 34_2, 34_3, 34_4, 34_5$ describe all sessions $22_1', 22_2, 22_3, 22_4, 22_5$ after the update.

The second type of announcements 37_2 is used only to send descriptions of sessions that have been added, removed or changed since the transmission of announcements $34_1, 34_2, 34_3, 34_4$ during the earlier cycle 38_1. In this example, no cycle precedes the earlier cycle 38_1. Thus, during the earlier cycle 38_1, there are no announcements of the second type 37_2. During the later cycle 38_1, the announcements $34_1', 34_5$ describe updated sessions $22_1', 22_5$ (Figure 9).

Usually, there will be more than two cycles 38_1, 38_2 of announcements. Furthermore, more sessions may be updated. Thus, each subsequent cycle (not shown) may or may not include announcements of the second type 37_2. Optionally, announcements of the second type 37_2 may be sent repeatedly during a cycle to protect against irrecoverable transmission errors.

Preferably, the structure of the session directory 28 (Figure 9) is described using a hierarchy of multicast IP addresses using SDP and SAP.

A process of describing the structure of the session directory 28 includes transmitting a first session announcement on a given multicast address. The first session announcement includes a second multicast address and other details relating to a session directory. The process includes transmitting a second session announcement on the second multicast address. The second session announcement includes a third multicast address and other details relating to a session sub-directory. Because sub-directories in turn can be used to announce a succeeding level of a session directory, the session directory hierarchy can be organized as a

tree of any depth. In this example, a root or default session announcement (not shown) is transmitted on a widely known address, which specifies a pair of addresses for receiving announcements of the first and second types 37_1, 37_2 respectively.

One or more "category" fields may be included in the session announcements for allowing clients 5 to filter and organize session announcements.

As described earlier, announcements of the first type 37_1 are transmitted on a first IP address, such as 224.2.17.0.

Referring to Figure 13, the first session announcement 34_1 may include an SDP description 36 of the first session 22_1 including, for example:

```
v=0
o=jsmith 2890842807 2890844525 IN IP4 10.47.16.5
c=IN IP4 224.2.17.12/127
t=2892054126 2892399688
m=data 9875 UHTTP UDP
a=cat:Full.Sports.Soccer
```

If the first session announcement 34_1 is updated, then the updated first session announcement 34_1' map include an SDP description 36 of the updated first session 22_1' including, for example:

```
v=0
o=jsmith 2890842807 2890844526 IN IP4 10.47.16.5
c=IN IP4 224.2.17.12/127
t=2892054126 2892399726
m=data 9875 UHTTP UDP
a=cat:Full.Sports.Soccer
```

Likewise, the second session announcement 34_2 may include an SDP description 36 of the second session 22_2 including, for example:

```
v=0
o=jsmith 2890842807 2890844526 IN IP4 10.47.16.5
c=IN IP4 224.2.17.13/127
t=2892054126 2892399726
m=video 9875 RTP/AVP 31
a=cat:Full.Sports.Soccer
```

Announcements of the second type 37_2 are transmitted on a second IP address, such as 224.2.17.1.

Referring still to Figure 13, the updated first session announcement 34_1' may include an SDP description 36 of the updated first session 22_1' (Figure 9) including for example:

```
v=0
o=jsmith 2890842807 2890844526 IN IP4 10.47.16.5
c=IN IP4 224.2.17.12/127
t=2892054126 2892399726
m=data 9875 UHTTP UDP
a=cat:Update.Sports.Soccer
```

The updated session 22_1' (Figure 9) may be identified as an updated session in a number of ways:

Firstly, the first session announcement 34_1 and the updated first session announcement 34_1' specify different version numbers in the "o=" field, namely **2890844525** and **2890844526** respectively. Thus, identifying an updated session may include comparing version numbers of the first and updated first session announcements 34_1, 34_1' and noting different version numbers.

Secondly, the updated first session announcement 34_1' is provided through a different channel, in this case a different IP address, which is reserved for announcements relating to updated sessions. Thus, identifying an updated session may include receiving an announcement on a different channel.

Thirdly, the updated first session announcement 34_1' includes a category field, which identifies the fact that the session announcement relates to an update. Thus, identifying an updated session may include determining whether an announcement identifies itself as relating to an update and/or determining a position within a session directory.

Method of operating the datacast service system 2

Referring to Figures 1 and 14, a method of operating the datacast service system 2 is shown.

The ESG management module 8 identifies whether sessions have been updated in the content database 12 (step S1). If it identifies any updated sessions, then it updates corresponding sets of metadata in the ESG database (step S2). Updating may include adding or deleting metadata. Metadata is passed to the service discovery server 10, which generates updated session announcements for any updated sets of metadata (step S3). The service discovery server 10 forwards a first set of announcements describing a plurality of sessions, in other words full session announcements, and a second set of announcements describing at least one updated session, in other words updated session announcements, to the datacaster 3 through different channels, such as different IP addresses (steps S4 & S5). The datacaster 3 receives the announcements and transmits them over the datacast network 4 to each clients 5.

Method of operating client 5

Referring to Figures 1 and 15, a method of operating the client 5 is shown.

The client 5 checks whether it has received all the session announcements of the first type 37_1 (step T1). If not, the client 5 listens to both types of announcements 37_1, 37_2 (step T1& T2). However, if the client 5 has received all the session announcements of the first type 37_1, then it can stop listening to announcements of the first type 37_1 and continue listening only to announcements of the second type 37_2. This has the advantage that it saves processing power and electrical power because fewer session announcements are received and/or processed.

The first and second types of announcements 37_1, 37_2 may include multicast addresses of announcements relating to other session directories, which in turn may include multicast addresses of announcements relating to further session directories.

Announcements of the first type 37_1 may be considered as relating to a session directory including sub-directories to a given depth of directory hierarchy. Announcements of the second type 37_2 may likewise be considered as relating to a session directory including sub-directories to a given depth of directory hierarchy. If announcements of either type 37_1, 37_2 relate to more than one session directory, then they can be used to announce the details of a different sub-tree of the IP session hierarchy. Thus, if descriptions of multiple subdirectories are transmitted using announcements of the first type 37_1, then the client 5 may stop receiving announcements relating to a particular subdirectory as soon as it has received all the different session descriptions of that subdirectory.

Split Session Directory – Second Example

Referring to Figure 16, a second example of an improved session directory 28" is shown. The session directory 28" is split into two parts at a relatively low level, in this example above the session level, and the two parts are referred to as the full session directory 29_{1a}, 29_{1b} and the updated session directory 29_{2a}, 29_{2b} respectively.

The ESG data 32 and the updated ESG data 32' are modified to reflect the structure of the second example of an improved session directory 28".

Session Announcements using UHTTP

A drawback of using session announcements employing SAP and SDP is that it is difficult for a client 5 to establish when it has received enough announcements of the first type 37_1 to describe the full session directory 29_1. Announcements 34_1', 34_2, 34_3, 34_4, 34_5 may be lost or corrupted and these protocols do not allow such events to be detected.

In an alternative embodiment, this problem is solved by linking together session announcements describing the full session directory 29_1.

A Unidirectional Hypertext Transfer Protocol (UHTTP) is used to implement a concatenated transfer of multiple session descriptions and references are made to the Society of Motion Picture and Television Engineers standard SMPTE 364M-2001 "Declarative Data Essence --- Unidirectional Hypertext Transport Protocol" and to "Appendix C: The Unidirectional Hypertext Transfer Protocol (UHTTP)" in Enhanced Content Specification, Advanced Television Enhancement Forum.

UHTTP supports MIME multipart/related content-type protocol, so allowing a single UHTTP transfer to comprise multiple independent MIME objects and reference is made to "The MIME Multipart/Related Content-type" by E. Levinson, RFC 2387, IETF (1998).

Referring to Figure 17, the ESG data 32 is considered as a single resource 39 which can be split into a plurality of data segments 40_1, 40_2, 40_3. In this example, there are fewer data segments than there are sets of metadata. However, the number of data segments may be equal or greater than the number of sets of metadata. Redundant error correction segments (not shown) may be calculated and interleaved with the data segments 40_1, 40_2, 40_3. The updated electronic service guide data 32' is processed in the same way.

Referring to Figure 18, a user datagram protocol (UDP) packet 41 is shown which includes a UDP header 42 and a UDP payload 43. The UDP payload 43 includes a UHTTP packet 44 which includes a UHTTP header 45 and a data segment 40_1, 40_2, 40_3 as payload. UHTTP allows each data segment 40_1, 40_2, 40_3 to be numbered.

Referring to Figure 19, ESG data 32 is transmitted as a linked transfer and updated ESG data 32' is also transmitted as a linked transfers. For the ESG data 32, first, second and third UDP packets 41_1, 41_2, 41_3 are transmitted. Likewise, for the updated ESG 32', fourth, fifth and sixth UDP packets 41_4, 41_5, 41_6 are transmitted. In each case, if one or more UDP packet 41_1, 41_2, 41_3, 41_4, 41_5, 41_6 is unsuccessfully

transmitted or data segment contained therein is unsuccessfully retrieved, then corresponding UDP packets 41_1, 41_2, 41_3, 41_4, 41_5, 41_6 are re-transmitted.

Descriptions of updated sessions are transmitted in a seventh UDP packet 41_7.

As described earlier, a default session announcement may be used to provide details of the full and updated session directories 29_1, 29_2. An example of a default session announcement may include:

```
v=0
o=dcaster 4289098098 4289099125 IN IP4 130.230.3.2
s=Experimental session directory service
i=Full and update session directories delivered via UHTTP
u=http://www.datacaster.com
e=dcaster@datacaster.com
c=IN IP4 224.2.17.12/127
t=2873397496 2873404696
m=data 42451 udp uhttp
a=X-session-directory-full
m=data 42452 udp uhttp
a=X-session-directory-updates
```

In this example described, the full session announcements and updated session announcements are provided on different port numbers. Also in this example, UHTTP is used full session announcements and updated session announcements. However, UHTTP may be used for full session announcements, while SAP and SDP may still be used for updated session announcements.

Numbering of data segments 40_1, 40_2, 40_3 allows the client 5 to detect when they have received the ESG data 32. Once this occurs, the client 5 listens for updates.

The use of UHTTP has another advantage. It supports forward error correction (FEC) which can be used to increase the probability of successful transmission even if bit and burst errors occur in transmission. If, however, FEC fails to recover any errors at the client-end, the client 5 waits for periodic UHTTP retransmission.

Alternatively, if a return path is provided, then automatic repeat request (ARQ) may be used.

Other protocols, such as Asynchronous Layer Coding, which provide reliable delivery of content may be used.

Asynchronous Layer Coding (ALC) is a scalable reliable content delivery protocol for IP multicasting and reference is made to "Asynchronous Layer Coding protocol instantiation" by M. Luby, J. Gemmell, L. Vicisano, L. Rizzo and J. Crowcroft, IETF, April 2002.

Reference is also made to "Reliable Multicast Transport Building Blocks for One-to-Many Bulk-Data Transfer" by B. Whetten, L. Vicisano, R. Kermode, M. Handley, S. Floyd and M. Luby, RFC 3048, IETF, January 2001.

Reference is also made to "Layered Coding Transport building block" by B. Whetten, L. Vicisano, L. Rizzo, M. Handley, S. Floyd and M. Luby, Internet Draft, IETF, February 2002.

Time Division Multiplexing

In the embodiments described earlier, IP packets comprising portions of ESG data 32, 32' can be transmitted by the datacaster 3 to the client 5 as-and-when transmission slots become available. However, to ensure that the client 5 receives the IP packets, it is preferable that the client 5 be configured to receive data at any time. This has the drawback of unnecessarily using processing and electrical power.

A solution to this problem is to employ time division multiplexing (TDM).

Referring to Figure 20, an alternative manner of transmitting a description of the session directory 28 is shown. In this example, only a later cycle 38_2' including the two types of session announcements 37_1, 37_2 is shown.

Announcements of the first type 37_1 for describing ESG data and announcements of the second type 37_2 for describing updates to ESG data are transmitted in different time slots 45_1, 45_2. For example, the announcements of the first and second types 37_1, 37_2 are transmitted in alternate time slots. However, the time slots 45_1, 45_2 need not be adjacent. The time slots may be of variable or fixed length.

Thus, if the client 5 wishes to listen for updates to ESG data, then they do not need to listen to time slots 45_1 during which announcements of the first type 37_1 are transmitted, but may listen to time slots 45_2 during which only announcements of the second type 37_2 are sent. This allows the client 5 to switch off its receiver 14 (Figure 1) during time slots 45_1.

Datacast client 5

Referring to Figure 21, the datacast client 5 comprises a processor 46, input/output interface 47, memory 48, a receiver 49 and a transceiver 50 which are connected via a bus 51. The input/output interface 47 is connected to a user interface 52, a display 53, storage 54 and speaker 55.

The datacast client 5 may be a mobile communication device for use with first and second wireless communication networks. For example, the first wireless communication network may be a DVB-T or DAB network and the receiver 49 may be configured to receive and demodulate signals from a DVB-T or DAB network. The second wireless communication network may be a UMTS network or other 3G, 2.5G or 2G telecommunications network and the transceiver 50 may be configured to receive/transmit and demodulate/modulate signals via a UMTS or similar network.

The datacast client 5 may be a set-top box connected to a television set for use with first and second wired and/or wireless communication networks. For example, the first communication network may be a DVB-T network and the receiver 49 may be configured to receive and demodulate signals from a DVB-T network. The second communications network may the Internet and the transceiver 50 may include a

modem (not shown) for connection via a public switched telephone network to an Internet Service Provider

Using two networks, sessions and session announcements may be transmitted over different networks. Alternatively, the first and second types of session announcements may be transmitted over different networks.

Computer programs (not shown) when loaded into memory 48 and run by the processor 46 cause the processor 46, in conjunction with other elements of the device, to provide the service discovery client 15, the ESG browser 17, the content filtering application 18 and the content browser 20 respectively. Storage 54 is used to hold the ESG and content databases 16, 19. The user interface 52 allows the user to provide instructions to the ESG browser 17 and the content browser 20, such as instruction to select a session. The display 53 allows the user to view session descriptions and session content. The speaker 54 allows the user to hear session content.

ESG browser

Referring to Figure 22, an example of an ESG browser window 56 is shown. The window 57 includes a first section 58 for receiving instructions for filtering sessions, for example on the basis of date of transmission, whether a session is current being transmitted or search terms. The window 57 includes a second section 59 for displaying a list of filtered sessions and receiving instructions to select a session. The window 57 includes a third section 60 for displaying a description of a selected session and receiving instructions to access the session.

It will be appreciated that many modifications may be made to the embodiment hereinbefore described.

Session announcements may be unicast, rather than multicast, to a client.

Sessions and session announcements may be transmitted over different networks. For example, sessions may be transmitted over a DVB network and session announcements may be sent via a DAB network.

The first and second types of session announcements may be transmitted over different networks. For instance, announcements of the first type may be transmitted through a DVB-T network, while announcements of the second type may be sent though a 3G network. The first and second types of session announcements may be transmitted through the same network, but over different physical channels, for example at different carrier frequencies. The first and second types of session announcements may be transmitted through the same network and over the same physical channels, but over different logical channels.

Claims

1. A method of announcing sessions transmitted through a network, the method comprising:

providing a first set of announcements describing a plurality of sessions; and

providing a second set of announcements describing at least one updated session.

2. A method according to claim 1, comprising providing said first set of announcements through a first channel and providing said second set of announcements through a second, different channel.

3. A method according to claim 1 or 2, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first address and providing said second set of announcements through a second, different address respectively.

4. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first destination address and providing said second set of announcements through a second, different destination address respectively.

5. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first IP address and providing said second set of announcements through a second, different IP address respectively.

6. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first IP multicast address and

providing said second set of announcements through a second, different IP multicast address respectively.

7. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first port number and providing said second set of announcements through a second, different port number respectively.

8. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first logical channel and providing said second set of announcements through a second, different logical channel respectively.

9. A method according any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises including in each announcement of said first set of announcements data for identifying said announcement as an announcement which describes a one of said plurality of sessions and in each announcement of said second set of announcements data for identifying said announcement as an announcement which describes a one of said at least one updated session.

10. A method according any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises including in each announcement of said first set of announcements respective data for specifying a position of a corresponding session within a first portion of a session directory and including in each announcement of said second set of announcements respective data for specifying a position of a corresponding session within a second portion of the session directory.

11. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises

providing said first set of announcements through a first physical channel and providing said second set of announcements through a second, different physical channel respectively.

12. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises providing said first set of announcements through a first network and providing said second set of announcements through a second, different network respectively.

13. A method according to any preceding claim, further comprising providing a third set of announcements describing another plurality of sessions including said at least one updated session.

14. A method according to any preceding claim, comprising:

providing said first set of announcements through a first channel;

providing said second set of announcements describing at least one updated session through a second, different channel; and

providing a third set of announcements describing another plurality of sessions including said at least one updated session through said first channel.

15. A method according to any preceding claim, comprising arranging the providing of said second set of announcements after the providing of said first set of announcements.

16. A method according to any preceding claim, wherein providing said first set of announcements and providing said second set of announcements comprises transmitting said first set of announcements through a first channel and transmitting said second set of announcements through a second, different channel.

17. A method according to any preceding claim, comprising transmitting said first set of announcements according to a session announcement protocol (SAP).

18. A method according to any preceding claim, comprising transmitting said first set of announcements according to a unidirectional transport protocol.

19. A method according to any preceding claim, comprising transmitting said first set of announcements according to unidirectional hypertext transfer protocol (UHTTP).

20. A method according to any preceding claim, comprising transmitting said first set of announcements according to asynchronous layered coding (ALC) protocol.

21. A method according to any preceding claim, comprising transmitting said first set of announcements according to user datagram protocol (UDP).

22. A method according to any preceding claim, comprising including a description of a corresponding session in each announcement.

23. A method according to any preceding claim, comprising including a description of a corresponding session arranged according to session description protocol (SDP) in each announcement.

24. A method according to any preceding claim, comprising providing means for determining whether all of said first set of announcements have been provided.

25. A method according to any preceding claim, comprising providing said first set of announcements as a series of linked messages.

26. A method according to any preceding claim, comprising providing said first set of announcements in a first set of time slots and providing said second set of announcements in a second set of time slots, each timeslot of said first set of timeslots being provided at a different time from each timeslot of said second set of timeslots.

27. A method according to any preceding claim, comprising multiplexing said first and second sets of announcements.

28. A method substantially as hereinbefore described with reference to Figures 1 to 22 of the accompanying drawings.

29. A computer program which, when executed by data processing apparatus, causes the data processing apparatus to perform a method of announcing sessions transmitted through a network according to any preceding claim.

30. A method of accessing sessions transmitted through a network, the method comprising:

selectively receiving a first set of announcements describing a plurality of sessions; and

selectively receiving a second set of announcements describing at least one updated session.

31. A method according to claim 30, further comprising determining whether all of said first set of announcements have been received.

32. A method according to claim 31, further comprising selecting not to receive further said first set of announcements and selecting to receive said second set of announcements.

33. A method according to claim 31 or 32, further comprising selecting not to receive a third set of announcements describing another plurality of sessions including said at least one updated session.

34. A method according to any one of claims 31 to 33, further comprising selecting to receive a fourth set of announcements describing at least one further updated session.

35. A method of accessing sessions transmitted through a network, the method comprising:

listening to a first set of announcements describing a plurality of sessions;

determining whether said first set of announcements have been received;

if said first set of announcements have been received, then

stopping listening to said first set of announcements and

listening to a second set of announcements describing at least one updated session.

36. A method according to claim 35, further comprising:

stopping listening to a third set of announcements describing a further plurality of sessions including said at least one updated session.

37. Apparatus for announcing sessions transmitted through a network, the apparatus comprising:

means for providing a first set of announcements describing a plurality of sessions; and

means for providing a second set of announcements describing at least one updated session.

38. Apparatus for performing the method according to any one of claims 1 to 28.

39. Apparatus for announcing sessions transmitted through a network substantially as hereinbefore described with reference to Figures 1 to 22 of the accompanying drawings.

40. Apparatus for announcing sessions transmitted through a network, the apparatus comprising:

a first transmitter for providing a first set of announcements describing a plurality of sessions; and

a second transmitter for providing a second set of announcements describing at least one updated session.

41. Apparatus for accessing sessions transmitted through a network, the apparatus comprising:

means for selectively receiving a first set of announcements describing a plurality of sessions; and

means for selectively receiving a second set of announcements describing at least one updated session.

42. Apparatus according to claim 41, comprising:

means for determining whether said first set of announcements has been received;

said apparatus being configured such that if said determining means determines that said first set of announcements has been received, then the means for selectively receiving said second set of announcements is configured to receive said second set of announcements.

43. Apparatus according to claim 42, comprising:

means for selectively receiving a third set of announcements describing another plurality of session including said at least one updated session;

said apparatus being configured such that if said determining means determines that said first set of announcements has been received, then the means for selectively receiving said third set of announcements is configured not to receive or not to forward said third set of announcements.

44. Apparatus according to any one of claims 41 to 42 which is a mobile communications device.

45. Apparatus for accessing sessions transmitted through a network substantially as hereinbefore described with reference to Figures 1 to 22 of the accompanying drawings.

46. A system for presenting program schedule data on a display, said system comprising at least two announcements, the schedule data being organized at least partly from a first set of announcements describing at least partly a plurality of

sessions and at least partly from a second set of announcements describing at least one at least partly updated session.

47. A system for presenting program schedule data on a display, said system comprising at least two announcements, the schedule data being organized at least partly from a first set of repeatable announcements describing a plurality of sessions, at least partly from a second set of repeatable announcements describing at least one at least partly updated session and at least session descriptions of at least one of the repeatable announcements for defining whether the at least one of the first and second announcements is received or not.

48. A system for delivering program schedule data to end-user terminals, said system comprising two sets of announcements, each set comprising at least one announcement, the schedule data being organized at least partly from a first set of announcements describing at least partly a plurality of sessions and at least partly from a second set of announcements describing at least one at least partly updated session.

49. A system for presenting program schedule data to end-user terminals, said system comprising at least two set of announcements, each set comprising at least one announcement, the schedule data being organized at least partly from a first set of repeatable announcements describing a plurality of sessions, at least partly from a second set of repeatable announcements describing at least one at least partly updated session and at least session descriptions of at least one of the repeatable announcements for defining whether the at least one of the first and second announcements is received or not.

50. A system according to any one of claims 47 to 49 claim, wherein the second set of announcements include a version number of each updated session for allowing a client to detect if they have missed an earlier update.

51. A system according to claim 50, wherein if a client detects it has missed an earlier update and is not currently receiving the first set of announcements, the

client starts receiving the first set of announcements until it has received a full and latest version of the program schedule data.

52. A system according to claim 51, wherein if the client detects that it has received a full and latest version of the program schedule data, it stops receiving the first set of announcements and continues receiving only the second set of announcements.

53. A system according to any one of claims 50 to 52, wherein if the client detects it has missed an earlier update, it fetches a full and latest version of the program schedule data over an interactive network.

54. A system according to any one of claim 47 to 53, where each set of repeatable announcements is divided into segments before transmission and a location of each segment within a whole transfer is indicated in a framing field of each respective segment; the indicated location enables clients to determine whether they have received all segments that constitute a given set or whether they need to wait for receiving more segments.

55. A system according to any one of claims 47 to 54, wherein the program schedule data is viewed either directly by a human end-user or automatically used by a software application.

56. A system according to any one of claims 47 to 55, wherein the program schedule data is presented progressively to a human end-user or made progressively available to an automatic software application as the said data is being received.

57. A system according to claim 55 or 56, wherein the program schedule data is viewed by a human end-user via a graphical user interface.

58. A system according to claim 55 or 56, wherein the program schedule data is used by a personal video recorder.

Application No:	GB 0229477.5	**Examiner:**	Ben Buchanan
Claims searched:	1-58	**Date of search:**	11 February 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1 at least	US 6286034 B1	CANON (see esp. col. 4, line 28 - col. 5, line 26 & Fig. 1B)
X	1 at least	US 6108706 A	MICROSOFT CORPORATION (see esp. abstract & col.6, lines 45-61)
A	all	WO 02/032025 A1	SOCIETE EUROPEENNE DES SATELLITES S.A. (see esp. p.16-18 & abstract)
A	all	WO 02/044920 A1	NAVIC SYSTEMS, INC. (see esp. abstract)
A	all	WO 02/082781 A2	NOKIA CORPORATION (see esp. abstract)

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[V]:

G4A

Worldwide search of patent documents classified in the following areas of the IPC[7]:

G06F

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, PAJ