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Datasheet for the decision of 16 July 2009

Case Number: T 0854/06 - 3.5.04

Application Number: 02102330.4

Publication Number: 1294193

IPC: H04N 7/173

Language of the proceedings: EN

Title of invention:
Method and apparatus for changing received streaming content channels

Applicant:
Thomson Licensing

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 84, 56

Keyword:
"Clarity (yes - after amendments)"
"Inventive step (yes - after amendments)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0854/06 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 16 July 2009

Appellant: Thomson Licensing
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 2 February 2006 refusing European application No. 02102330.4 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: F. Edlinger
Members: M. Paci
C. Vallet

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division refusing European patent application No. 02 102 330.4, which was published as EP 1 294 193 A1.

II. The following documents, cited as prior art in the decision under appeal, are relevant to the present decision:

D1: D.-J. Lu et al., "Experience in designing a TCP/IP based VOD system over a dedicated network", Proceedings of 1997 IEEE International Symposium on Consumer Electronics, Singapore 2-4 Dec. 1997, pages 262-266.

D2: N. Kamiyama et al., "Renegotiated CBR Transmission in Interactive Video-on-Demand System", International Conference on Multimedia Computing and Systems (ICMCS'97), 1997, pages 12-19.

D3: H. Kalva et al., "Techniques for Improving the Capacity of Video-on-Demand Systems", Proceedings of the 29th Annual Hawaii International Conference on System Sciences, 1996, pages 308-315.

III. The decision under appeal was based on the grounds that claim 1 was unclear (Article 84 EPC 1973) and that the subject-matter of claims 1 and 7, as construed by the examining division, lacked novelty (Article 54(1) and (2) EPC 1973) with respect to D3. As to dependent claims 2 to 6, their subject-matter was regarded as not involving an inventive step (Article 56 EPC 1973) in view of D1 to D3. The objections raised against claims 1 to 7 were also held to apply to claims 8 to 16.

IV. With the statement of grounds of appeal the appellant (applicant) filed a set of amended claims replacing all previous claims.

V. In a communication accompanying the summons to oral proceedings the board expressed the preliminary opinion that amendments to the claims appeared not to comply with Article 123(2) EPC and that the wording of the claims lacked clarity (Article 84 EPC 1973). In addition, the board expressed doubts as to whether the subject-matter of claim 1 was novel with respect to D1 or involved an inventive step in view of D3.

VI. With a letter dated 16 June 2009 the appellant filed amended sets of claims according to a main request and first to third auxiliary requests.

VII. During the oral proceedings held on 16 July 2009 before the board the appellant withdrew all previous requests and filed a single new request comprising a set of amended claims and amended description pages.

VIII. The appellant's final request is that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 8 and the description pages filed in the oral proceedings and the drawing pages as originally filed.

IX. Independent claims 1, 4 and 8 read as follows:

"1. A method of transferring a digital content channel signal comprising the steps of:

sending a command to a source (101) upon turning on a channel or changing channels;

receiving, from the source (101), at a buffer and at a rate substantially greater than a streaming content playout rate of content in said digital content channel signal, a first content stream on a first connection that is a point-to-point connection carrying said digital content channel signal (201);

the source (101) determining at what point the buffer has received a predefined amount of data from the content channel signal, the predefined amount of data corresponding to an amount of data for decreasing the severity of jitter during a playout of content in the digital content channel signal;

the source (101) switching from the first content stream on the first connection to a second content stream on a second connection carrying said digital content channel signal once the buffer has received the predefined amount of data, the second connection being one of multicast, broadcast, and asynchronous-transfer-mode point-multipoint and connecting the source (101) and the buffer, wherein the second content stream is transferred to the buffer substantially at the playout rate of content in the digital content channel signal (202); and

receiving, from the source (101), the second content stream on the second connection."

"4. A system for transferring a digital content channel signal comprising:

means for sending a command to a source (101) upon turning on a channel or changing channels;

means for receiving, from the source (101), at a buffer, and at a rate substantially greater than a

streaming content playout rate of content in said digital content channel signal, a first content stream on a first connection that is a point-to-point connection carrying said digital content channel signal (201); and

the source (101) being provided with

means for determining at what point the buffer has received a predefined amount of data from said digital content channel signal, the predefined amount of data corresponding to an amount of data for decreasing the severity of jitter during a playout of content in said digital content channel signal, and

means for switching from the first content stream to a second content stream on a second connection carrying said digital content channel signal once the buffer has received the predefined amount of data, the second connection being one of multicast, broadcast, and asynchronous-transfer-mode point-multipoint and connecting the source and the buffer, wherein the second content stream is transferred to the buffer substantially at the playout rate of content in said digital content channel signal (202)."

"8. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform the method of one of claims 1 to 3 and 5 to 7."

Claims 2, 3 and 5 to 7 are dependent on claim 1.

X. The examining division's reasoning in the decision under appeal with respect to the claims then on file, insofar as relevant to the present set of claims, can be summarised as follows.

Regarding claim 1

Clarity (Article 84 EPC 1973)

The step of "*switching from the first content stream to a second content stream*" in the method of claim 1 is unclear for the following reasons.

There is no clear basis in the description for switching between different, distinguishable data streams. The only difference that can be observed is that the data are transmitted at a high transmission rate during the pre-loading of the buffer and thereafter at a normal transmission rate for the rest of the session. According to the application as filed (see page 3, lines 2 to 4), at the change of transmission rate "*the video connection can be switched to a video multicast connection*". However the application (see page 5, lines 21 to 29, and figure 2) also discloses that the change of transmission rates can now also happen "*in a one-to-one relationship*", in which case the data stream remains the same, only the transmission rate being changed. The latter case causes confusion as to what is meant by "*switching from the first content stream to a second content stream*".

Moreover the expressions "*on a first connection*" and "*on a second connection*" do not add more distinctive power, since there is no distinctive element in the application allowing a reader to clearly distinguish between different connections.

Novelty (Article 54(1) and (2) EPC 1973)

Based on the above considerations, the feature of claim 1 judged unclear is construed such that switching effectively corresponds to first transmitting the content to the receiver at a rate substantially higher than the playout rate and then transmitting it at substantially the playout rate.

The method of claim 1 is known from the disclosure of D3 which describes a method for transmitting video content to different users. Section 4 of D3 describes several variations of multicasting in which more than one user requests a video at substantially the same time. As can be seen in figure 4, user 3 receives the requested content in the first stream at a data rate which is twice the standard playout rate. The "first stream" in this context is considered to consist of the data segments 2.1, 1.3 and 2.2. When time equals 18 minutes on figure 3, user 3 switches from the first stream to a "second stream" starting with segments 1.4, 1.5 and 1.6, which is a multicast transmitted to all users 1 to 3. The second stream is transferred to user 3 at substantially the playout rate. It is further evident (see, for example, the sentence bridging pages 310 and 311) that the content streams are received at the buffer of each user. Hence the method of claim 1, when interpreted along the lines indicated above, is known from D3.

Regarding claims 2 to 16

In this context the examining division expressed the opinion that the features of claims 4 and 5 are

implicitly known from D1 in which the data rate is controlled by the degree of fullness of the buffer. The method of claim 6 is known from D3 (erroneously referred to as D4 in the decision), since the system of D3 is specifically designed for multicast. The objections raised against claims 1 to 7 also hold against claims 8 to 16, since the method claimed therein corresponds to claims 1 to 7 and is only considered from the viewpoint of the transmitter.

XI. The appellant essentially argued as follows regarding his final request before the board of appeal.

The amendments made to the claims and description overcome all objections based on Article 123(2) EPC or Article 84 EPC 1973.

D1 fails to disclose or suggest the use of two connections, one of which being one of multicast, broadcast and asynchronous-transfer-mode point-multipoint. In the method of D1 there is only one connection between the server and each client, and it is always point-to-point.

D3 does not address the problem of jitter but a different problem of a user (user 3 in figure 4) wanting to watch an already started multicast movie. Moreover there is no channel/connection in D3 which has a transmission rate greater than the playout rate.

Hence the claimed subject-matter is novel and involves an inventive step.

Reasons for the Decision

1. The appeal is admissible.

Admissibility of the amended claims and amended description pages filed during the oral proceedings

2. The board noted that the amendments filed during the oral proceedings were made to overcome the objections of added subject-matter and lack of clarity raised earlier and that they added no significant complexity to the case. For these reasons the board decided to exercise its discretion under Article 13(1) and (3) RPBA to admit these amendments.

Amendments (Article 123(2) EPC)

3. The amendments made to claim 1 have a basis in the application as filed as shown below:
   - sending a command to a source upon turning on a channel or changing channels (see page 4, lines 23 to 26);
   - a first connection is a point-to-point connection (see page 4, lines 30 to 32);
   - the source determining at what point the buffer has received a predefined amount of data (see from page 5, line 31, to page 6, line 3, and page 5, lines 4 to 7);
   - the predefined amount of data corresponding to an amount of data for decreasing the severity of jitter (see from page 3, line 31, to page 4, line 2);

– the source switching ... once the buffer has received the predefined amount of data (see page 5, lines 5 to 7 and 23 to 26) and
– the second connection being one of multicast, broadcast and asynchronous-transfer-mode point-multipoint (see original claims 6 and 13).

The amendments made to other claims (those made to claim 4 correspond to those of claim 1) and to the description also have a basis in the application as filed.

The board is therefore satisfied that the requirements of Article 123(2) EPC are met.

Clarity (Article 84 EPC 1973)

4. In the decision under appeal the examining division objected that the step of switching from the first content stream to a second content stream in the method of claim 1 was unclear because there was no clear basis in the description for switching between different, distinguishable data streams (see section X above). Moreover the division held that the expressions "*on a first connection*" and "*on a second connection*" did not add more distinctive power, since there is no distinctive element in the application allowing a reader to clearly distinguish between different connections.

In contrast to claim 1 considered in the appealed decision, present claim 1 specifies that the first content stream is on a first connection which is a point-to-point connection, whereas the second content

stream is on a second connection which is one of multicast, broadcast and asynchronous-transfer-mode point-multipoint. The first and second content streams are now clearly distinguished because they are transmitted on different well-defined types of connections. Moreover the statement on page 5, lines 25 to 27, of the description that the second connection could also be a point-to-point connection, which is inconsistent with the method of present claim 1, has been removed.

Corresponding amendments have been made to the system of claim 4. Claims 2, 3 and 5 to 8 include all the steps of the method of claim 1 and are regarded as clear.

The board thus considers that the objections under Article 84 EPC 1973 in the decision under appeal have been overcome and that the claims are clear and supported by the description.

Novelty (Article 54(1) and (2) EPC 1973)

5. Novelty with respect to D1

D1 discloses a digital interactive video-on-demand (IVOD) system transmitting video signals from a video server to a plurality of clients over a dedicated network using the TCP/IP protocol. Each client is connected to the server by a point-to-point connection on which the VOD is transmitted (see figure 1 and page 265, left column, last paragraph, showing that the video stream can be paused by the client, which is only possible with a point-to-point connection, not with

multicast or broadcast). Each client has a preload buffer, which can store approximately 2 seconds of video data at the display/playout rate for regulating the delay jitters (see page 263, right column, bottom half). A VOD client requests the video server for more packets whenever the client buffer is not full (see page 263, right column, bottom half, page 264, first two lines, and page 266, left column, first eight lines). The preloading of the client buffer occurs at a rate substantially greater than the display/playout rate after a client request such as movie selection, movie deletion, play, stop or fast forward is sent to the server (see spikes on figure 5 and page 265, paragraph bridging the left and right columns).

The method of claim 1 thus differs from the method of D1 in that the source switches from the first content stream on the first point-to-point connection to a second content stream on a second connection once the buffer has received a predefined amount of data (which is determined by the source), the second connection being one of multicast, broadcast and asynchronous-transfer-mode point-multipoint. In D1 all connections between the server and the clients are point-to-point.

Hence the method of claim 1 is novel with respect to D1.

6. Novelty with respect to D3

D3 discloses a method of transferring a digital signal over a network from a video server to a set-top box (STB) in a VOD system (see figure 1). According to one example, the video signal to be transferred is divided in video segments each containing six minutes of video

at the playout rate. Every six minutes a segment is transmitted over the network for two minutes at three times the playout rate (see section 3 and figure 3). The average rate of transmission to an individual set-top box is thus equal to the playout rate. The segments are stored in a buffer at the STB before being read out at the playout rate. The transmission over the network can be point-to-point (also known as "unicast"), broadcast (sent to all STB) or (partial) multicast (sent to a group of STBs), as explained in section 4, first and second paragraphs of D3. In the simplest case of multicasting all the segments are synchronously multicast to all the selected STBs (users 1 and 2 before the user 3 request in figure 4). Since the buffer in a STB can store several video segments, it is also possible for a user to request a multicast for a film which has already started, if the number of segments already sent does not exceed the capacity of the buffer. This is called "partial multicast" and is illustrated in figure 4 where user 3 requests the multicast after the first two segments (1.1 and 1.2) have already been transferred to multicast users 1 and 2 over the multicast channel (channel 1). These two missed segments (1.1 and 1.2) are then transmitted directly to user 3 (as segments 2.1 and 2.2) over a point-to-point connection (channel 2). User 3 thus receives the following segments in the following order (segments on multicast channel 1 start with a "1" and those on point-to-point channel 2 with a "2"): 2.1, 1.3, 2.2, 1.4, 1.5, 1.6, 1.7 and so on. On each of the two connections (channels 1 and 2) the segments are transferred at the playout rate. However, since user 3 receives segments over two channels, the first four segments 2.1, 1.3, 2.2, 1.4 are received by the STB at

an overall transfer rate which is twice that of the playout rate (see figure 4).

The method of claim 1 thus differs from the method of D3 by the following features:

- the first content stream having a rate substantially greater than the playout rate is transmitted on a first connection which is a point-to-point connection;
- the source determining at what point the buffer has received a predefined amount of data corresponding to an amount of data for decreasing the severity of jitter during the playout of content and
- the source switching from the first content stream on the first connection to the second content stream once the buffer has received the predefined amount of data.

For the above reasons, the method of claim 1 is novel with respect to D3.

7. Novelty with respect to D2

D2 discloses an interactive video-on-demand (IVOD) method for transferring digital video signals from a video server to a plurality of set-top-boxes (STB). The connection between the video server and each STB is necessarily point-to-point because of the IVOD requirements (see D2, section 1, first paragraph). In order to avoid underflow and overflow at the STB buffer, the transmission rate and its timing of renegotiation are determined dynamically based on the STB queue length. When the STB wants to change the allocated bandwidth it sends a control packet including new

bandwidth information to the server. The basic idea of the method is to increase the bandwidth when a buffer underflow is predicted and to decrease it when a buffer overflow is predicted (see section 3.1).

Hence D2 does not disclose at least the following steps/features of the method of claim 1:

- switching from a first connection to a second connection, the second connection being one of multicast, broadcast and asynchronous-transfer-mode point-multipoint (all server-STB connections are point-to-point in D2);
- transferring the second content stream on the second connection substantially at the playout rate (the dynamical adjustment of the transmission rate in D2 causes the rate to constantly vary above and below the playout rate) and
- the source determining at what point the buffer has received a predefined amount of data for decreasing the severity of jitter (the source in D2, i.e. the video server, does not determine this; instead the STB sends a control packet to the server to request a change of transmission rate).

Accordingly the method of claim 1 is novel with respect to D2.

8. For analogous reasons the same conclusion applies to the subject-matter of claims 2 to 8 in view D1, D2 and D3.

Inventive step (Article 56 EPC 1973)

9. Claim 1 - obviousness starting from D1

9.1 Closest prior art

The appellant has not disputed that D1 represents the closest prior art for the method of present claim 1 because D1, like the claimed invention, relates to the downloading of streaming content and to preloading of a buffer in order to decrease the severity of jitter (see D1, page 266, left column, lines 7 and 8). The term "jitter", as set out in the middle paragraph of page 1 of the description, relates to a deviation in, or displacement of, the bit arrival times of a digital signal.

In the decision under appeal the examining division apparently regarded D3, which does not mention jitter, as the closest prior art for the subject-matter of dependent claims 2 to 6 (inventive step was not assessed for the method of independent claim 1 because it was regarded as not novel). Compared to claim 1 of the appealed decision, present claim 1 has been limited in a manner, in particular by the explicit mention of jitter, which renders D3 less relevant than D1 because the additional segments of digital data transferred to a user in D3 do not prevent (stochastic) changes of bit arrival times, but the amount of transferred data corresponds to the time period missed when a user (user 3) requests a multicast of a film which has already started (see point 6 above).

9.2 Objective technical problems

The board considers that the distinguishing features (see section 5 above) of the method of claim 1 with respect to D1 solve the following objective technical problems:

(a) simplifying the preloading of the buffer (solved by the source determining at what point the buffer has received a predetermined amount of data sufficient for decreasing the severity of jitter, as opposed to the client requesting the server to send more packets whenever its buffer is not full, see D1, page 263, right column, bottom half) and

(b) allowing fast channel changing of de-jittered channel content without increasing the network traffic more than necessary (solved by using a point-to-point connection only for the buffer preloading, and multicast or broadcast thereafter, as opposed to point-to-point connections all the time in D1).

9.3 Obviousness

Regarding the features of claim 1 solving problem (a), both D1 and D2 teach that the server must receive some information from the client before changing the transmission rate in relation to the preloading of the client buffer. In D1 the client sends a request for packets (see page 263, right column, bottom half) and in D2 the server changes the transmission rate based on information sent by the buffer on the queue length inside the client buffer (see section 3.1). Hence there is no suggestion that the server should just send a predetermined amount of data at the greater

transmission rate upon receiving a command when a channel is turned on or changed. In D3 the server sends a predetermined amount of data (two segments, i.e. 12 minutes of video) to the buffer of user 3 (see figure 4). However the purpose is not to overcome jitter (jitter is not mentioned in D3) but to allow user 3 to receive in multicast a movie which has already started. Although two segments contain more than enough data for decreasing the severity of jitter, it is doubtful that the skilled person would derive from D3 any teaching applicable to the simplifying of preloading of the client buffer in D1 where preloading is already done at a rate substantially greater than the display/playout rate (see point 5 above).

Regarding the features of claim 1 solving problem (b), all the server-client connections in D1 are point-to-point. This is apparent from figure 5 and the corresponding description which explain that the user can interact with the VOD movie (the so-called "interactive VOD" or "IVOD") being transferred, for instance by pausing it or fast forwarding it. Such interactions, effectively making the VOD appear to the user like a virtual VCR, are feasible only if the connection with the server is point-to-point. In a multicast environment where several users simultaneously watch the same movie, one user would not be able to pause the (data transfer for the) movie without affecting the other users. D2 also addresses buffer preloading in the context of IVOD, so all connections are always point-to-point (see section 3.1 of D2). D3 does not address the problem of preloading a buffer for decreasing jitter. Moreover, during the preloading of the buffer of user 3 (see figure 4 of D3),

the data is transmitted over two (logical) connections, one (channel 1) being multicast, the other (channel 2) being unicast. On neither of these two connections is the transfer rate greater than the display/playout rate.

For the above reasons, the method of claim 1 is not obvious in view of D1, D2 and D3 when starting from D1 as closest prior art.

10. Claim 1 - obviousness starting from D3

As explained under point 9.1 above, the board does not regard D3 as the closest prior art for present claim 1, in particular because it does not deal with the problem of jitter.

Nevertheless, if the skilled person were to start from D3 he/she would find no obvious reason or incentive in the disclosure of D3 to change the way the segments are transferred from the server to user 3 in figure 4, in such a way that video data is sent to user 3 on a point-to-point connection at a rate greater than the display/playout rate. There is no need for dejittering in D3 because, when user 3 starts viewing the film (with delay), there is already enough data in the buffer. The skilled person would also not draw such an incentive from D1 or D2 either because they address the problem of jitter, not the problem of D3 of a user wanting to receive an already started film in multicast.

Hence the method of claim 1 is not obvious when starting from D3, even in combination with D1 or D2.

11. For the above reasons, the method of claim 1 is not rendered obvious by the combined teachings of D1, D2 and D3.

12. Claims 2 to 8 - inventive step

The system of claim 4 comprises means corresponding to the steps of the method of claim 1 and is therefore also not rendered obvious by D1, D2 and D3. The same conclusion applies to the subject-matter of claims 2, 3 and 5 to 7 which are dependent on claim 1 and to the program storage device of claim 8 which make explicit reference to performing the method of claim 1.

13. For the above reasons the board concludes that the decision under appeal has to be set aside and that a patent is to be granted on the basis of the appellant's single request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent in the following version:
   - Description: pages 1, 2, 2a, 2b and 3 to 6 received during oral proceedings of 16 July 2009;
   - Claims: No. 1 to 8 received during oral proceedings of 16 July 2009;
   - Drawings: sheets 1/3 to 3/3 as originally filed.

The Registrar: The Chairman:

L. Fernández Gómez F. Edlinger