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D E C I S I O N
of 24 October 2001

Case Number: T 0151/99 - 3.5.1

Application Number: 90200189.0

Publication Number: 0381275

IPC: H04L 12/56

Language of the proceedings: EN

Title of invention:

Method for transmitting, via a plurality of asynchronously time-divided transmission channels, a flow of data cells, the state of a counter for each transmission channel being kept up to date in accordance with the number of data cells per unit of time

Patentee:

Koninklijke KPN N.V.

Opponents:

- (01) Italtel Società Italiana Telecomunicazioni S.P.A.
(02) Siemens AG

Headword:

Transmission of data cells/KPN

Relevant legal provisions:

EPC Art. 54(1), 54(2), 56

Keyword:

- "Document made available to the public (yes)"
"Novelty (no, main and first auxiliary request)"
"Inventive step (no, second auxiliary request)"

Decisions cited:

G 0001/95, G 0007/95, T 0472/92, T 0522/94

Catchword:

In general, it would appear highly plausible that a paper submitted to obtain an academic degree (here: a master's thesis) is not confidential. This becomes a virtual certainty if the paper is referred to in published scientific work. If the reference is in a document published before the priority date of the patent in suit then it can be assumed that said paper was also made available to the public before said date.



Case Number: T 0151/99 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 24 October 2001

Appellant: Koninklijke KPN N.V.
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Representative: -

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 24 November 1998
revoking European patent No. 0 381 275 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: S. V. Steinbrener
Members: A. S. Clelland

H. Preglau

Summary of Facts and Submissions

I. This is an appeal against the decision of the opposition division to revoke European patent number 381 275 on the ground that the subject-matter of independent claim 1 of all requests lacked an inventive step having regard to the disclosure of the following documents (using the opposition division's notation):

D1: "CONGESTION CONTROL IN A FAST PACKET SWITCHING NETWORK", Master of Science thesis by Shahid Akhtar at the Washington University, Saint Louis, Missouri, USA, dated "December 1987".

D2: EP-A-0 293 315.

II. The patentee (appellant) lodged an appeal against this decision and paid the prescribed fee. In a statement of grounds of appeal it was argued that document D1, on which the opposition division had primarily relied, had not been available to the public before the priority date of the patent. But even if the Board were to hold that D1 formed part of the state of the art, the claimed subject-matter was not obvious having regard to the disclosure of D1 or the other document considered by the opposition division, D2. Oral proceedings were requested.

III. Opponent 01 (respondent 01) argued in response to the statement of grounds that document D1 was prior art; reference was made to a paper published before the priority date and which it was argued referred to D1. This paper was discussed in the opposition proceedings and is hereinafter referred to as D3:

- D3: G.M. Woodruff et al: "A Congestion Control Framework for High-Speed Integrated Packetized Transport", GLOBECOM '88, November/December 1988, IEEE 1988, pages 7.1.1 to 7.1.5.
- IV. Opponent 02 (respondent 02), in a response to the statement of grounds of appeal, argued that the subject-matter of the claims of all requests lacked novelty having regard to the disclosure of D2. Oral proceedings were requested.
- V. In a communication accompanying a summons to oral proceedings the salient issues were identified by the Board as being firstly, whether D1 had been made available to the public before the claimed priority date and secondly, whether the independent claims of the various requests were novel and inventive with respect to the disclosure of D1 (if prior published) and D2.
- VI. Prior to the oral proceedings, which were held on 24 October 2001, the appellant filed new claims of a main request and first and second auxiliary requests. Claim 1 of the main request, which was maintained at the oral proceedings, reads as follows:

"A method for transmitting, via a transmission medium with a plurality of virtual, asynchronously time-divided transmission channels, a flow of data supplied to that transmission medium, and consisting of data cells which are each transmitted via one of those transmission channels, and each of which comprises a group of control words with one or more control words as well as a group of information words with one or more information words, the group of control words

comprising a control word with a channel indication indicating via which transmission channel the relevant data cell has to be transmitted, and the state of a counter being kept up to date in a time divided way for each transmission channel, which state has a certain fixed minimum value and which is on the one hand decreased proportional to the time, and which is on the other hand increased proportional to the number of data cells with a channel indication, indicating said transmission channel, which state of the counter is compared with a threshold value, when a data cell with a channel indication indicating said transmission channel arrives at the beginning of the transmission medium at a certain moment of arrival, after which the data cell will be let through to the transmission medium located downstream, when the state of the counter is less than said threshold value, or it will not be let through to the transmission medium located downstream, when the state of the counter is more than or equal to said threshold value, characterized in that the state (CV) of the counter (9) will be decreased on the arrival of the data cell by a value which is the product of a first constant value (C1) which is a previously recorded channel specific parameter for said transmission channel and the length of time (Δt) between the moment (t1) of arrival of that data cell and the moment (t2) of arrival of a preceding data cell with the same channel indication, and in that the state of the counter is increased by a second constant value (C2), which is a previously recorded channel specific parameter for said transmission channel, if on said comparison the state of the counter turned out to be less than the threshold value."

VII. Claim 1 of the first auxiliary request was amended in

the course of the oral proceedings and is an independent method claim which adds to the end of claim 1 of the main request that "C1 or C2 are not equal to 1". Claim 1 of the second auxiliary request is an independent method claim which adds to the end of claim 1 of the main request that "the length of time is (Δt) is determined with a previously recorded channel specific resolution".

- VIII. Claim 8 of each request is an independent claim directed to a device for controlling a flow of data channel by channel, the device comprising features based on the method steps of the respective method claim.
- IX. The respondents requested that the appeal be dismissed, or if the Board were minded to allow an auxiliary request, the case be remitted to the opposition division for further examination.
- X. At the end of the oral proceedings the chairman announced the decision of the Board.

Reasons for the Decision

1. The appeal is admissible.
2. *Availability to the public of D1*
 - 2.1 In the course of both the opposition and the present proceedings the appellant argued that D1 was not part of the state of the art as defined by Article 54(2) EPC because it had not been made available to the public prior to the claimed priority date. All the evidence

presented by respondent 01 was circumstantial and failed to prove conclusively that publication had taken place. In particular, no evidence had been presented from the librarian at Washington University; in fact, the document had not been catalogued before the claimed priority date and an internet search undertaken early in the course of the opposition proceedings had failed to locate the document in the university library. The two affidavits presented by respondent 01 in the proceedings before the opposition division merely showed an oral presentation of the thesis by the candidate and referred vaguely to a date "on a weekday between October 15 and 25, 1987". This evidence failed to prove that the defence of the thesis had taken place in a public forum; at page 68 of document D1 the candidate acknowledged support from four companies, including respondent 02, implying that the research was of a commercial nature and therefore highly probably confidential. It was common for theses to be defended privately in such cases. Admittedly D3 referred to the thesis but there was a link between one of the candidate's sponsors, namely Bell Communications Research, and the authors of D3, who were employed by Bell Northern Research. It was therefore plausible that the authors of D3 had received notice of D1 from within the company, again suggesting an obligation of confidentiality. Moreover, D3 only made two passing references to passages in D1, neither of which related to the claimed subject-matter. The established case-law of the Boards of Appeal, see T 522/94, was that an opposition was adequately substantiated only if in respect of at least one of his grounds for opposition the opponent adduces facts, evidence and arguments establishing a possible obstacle to patentability under the EPC. Unsubstantiated allegations do not meet this

requirement. It was therefore clear that the burden of proof as to the public availability of a document rested with respondent 01 and that this burden could only be discharged by proving "up to the hilt" that the thesis had been made public. Otherwise, the opposition by respondent 01 should be considered inadmissible since it only relied on a post-published document.

2.3 In the statement of grounds of appeal the appellant also requested that the issue be referred to the Enlarged Board of Appeal and proposed a number of questions based firstly on the status of a master's thesis and its defence as regards Article 54(2) EPC and secondly on the status of a first document of uncertain public availability which is referred to in a second, published, document.

2.4 Dealing with the issue of referral to the Enlarged Board first, the appellant did not pursue this request at the oral proceedings and it has not therefore been necessary for the Board to decide on it. It is however observed that the issues raised were essentially matters of fact rather than law, so that no issue relating to the uniform application of the law or an important point of law, Article 112 EPC, arises. The question of whether any particular document has been published is a question of fact, to be decided on the evidence available.

2.5 Turning now to the question of whether D1 constitutes prior art, the affidavits filed in the course of the opposition proceedings are indeed unsatisfactory in that they are vague as to the exact details of the defence of the thesis and fail to state clearly that the presentation of the thesis occurred without any

obligation of confidentiality on the part of those attending. The Board moreover notes the close similarity of wording of the two documents. On the other hand, it has to be accepted that some nine years after the event it is unlikely that any of the parties involved will have detailed memories and both affidavits reflect this, apparently being based on a supposition of what must have taken place given the usual procedures followed in such cases. Hence, although it would a *priori* appear highly plausible that papers submitted to obtain an academic degree are not confidential, in the Board's view neither affidavit satisfactorily proves that D1 was made available to the public as required by Article 54(2) EPC.

- 2.6 There remains however the reference to D1 in D3. It is common ground between the parties that D3 constitutes a prior publication. In the description of Figure 2 at page 7.1.3, left-hand column, on page 7.1.3, right-hand column, fourth paragraph, and on page 7.1.4, left-hand column, second paragraph, the reference [7] refers to D1 which is described as a "Master's Thesis, Washington University, St. Louis, Missouri, December 1987". The references at page 7.1.3 relate to assessing link utilisation by modelling the input traffic flow as a two-state Markov chain and to the derivation of the virtual bandwidth V whilst the reference at page 7.1.4 refers to the use of the "leaky bucket" detector for policing traffic (the term "descriptor" is used in the document). The question to be decided is accordingly whether the skilled person, desiring to find out further details of the "leaky bucket" detector mentioned at page 7.1.4, would have been able to obtain a copy of D1.

2.7 It was argued by respondent 01 that D1 was accordingly in the same position as a German "laid-open" patent specification; such documents were not actually published in the usual sense of the word but were made available at the German Patent Office and anyone who wished could inspect them; it had always been clear that this constituted publication. Since D1 was referred to in D3 the overwhelming probability was that anyone using the bibliographic data and contacting the library of Washington University would have been able to obtain a copy. It would suffice for a single person to obtain a copy and this had clearly happened since D1 was referred to in D3 and was therefore available to at least one of the authors of D3.

2.8 It was argued by the appellant that this was purely speculative and did not meet the standard set in T 522/94. It was not unknown for scientific papers not to be published and if there were patentable subject-matter in a thesis it was usual for it to be kept confidential.

2.9 In the Board's view the reference in D3 makes it overwhelmingly probable that D1 had indeed been made available to at least one member of the public before the claimed priority date. Had any of the authors of D3 been put under an obligation of confidentiality as regard the contents of D1, there would have been no reason to mention it at all; certainly no purpose would have been served by including the document in the references. The fact that it is so included leads the Board to the conclusion that it was in fact available to anyone who asked for it. The appellant was unable to prove a connection between Bell Communications Research, referred to in the acknowledgments at page 68

of D1 and Bell Northern Research, the employers of the authors of D3; but even if there were, the author of the thesis mentions four sponsors for the research discussed in D1 and no evidence was produced to show any relationship between these four sponsors. In fact, the sponsors would *prima facie* appear to be rather different organisations having no direct joint commercial interest. This suggests that the candidate received money or practical support from each of them but was under no particular obligation. The thesis itself contains nothing which would suggest that its circulation was restricted or in any way confidential and the reference in the acknowledgements to "all the members of the Computer and Communications Research Laboratory" and the help they are said to have given in the writing of the thesis again suggests that no obligation of confidentiality existed. The standard asserted by the appellant, that publication must be proved "up to the hilt" is apparently derived from case T 472/92, which related to the question of prior use in which practically all the evidence in support of alleged prior public use lies within the power and knowledge of the opponent, so that the patentee seldom has any ready or indeed any access to it at all. It is accordingly clear that the facts in the present case distinguish from the situation the board was faced with in case T 472/92.

2.10 The Board accordingly concludes that on the evidence at its disposal D1 was made available to the public before the claimed priority date.

3. *Technical background*

3.1 In the telecommunications field the problem has arisen

of providing flexible channel bandwidth to cope with so-called "bursty" traffic such as video sequences. In the mid 1980's the preferred transmission technique made use of time-division multiplex channels each divided into 64 K bit/sec blocks, but such an arrangement has the disadvantage that there is considerable redundancy since for any given path a channel must be allocated at the maximum allowed data rate. An attractive alternative is the asynchronous transfer mode (ATM) in which all data is sent in the form of fixed-length cells comprising a header containing addressing information and a payload. ATM is highly flexible and scalable but has the disadvantage of being comparatively difficult to police. In effect, each user is allocated a virtual channel and in order to ascertain the data rate to/from any given user it is necessary to monitor all cells to determine which cells have the virtual channel address. In order to prevent users abusing their agreed data rate capacity some form of "usage parameter control" or policing is therefore necessary. One method is to monitor the overall data rate and drop cells if this is exceeded, but this has the disadvantage that the delinquent user is not identified and an innocent party may lose data. Policing virtual channels can be expensive and in essence involves monitoring all data entry points.

- 3.2 In addition to the number of points to be monitored a further variable in any policing system is the range of rates which can be policed and, within that range, the number of discrete rates; it is desirable to provide a large number of steps within the range of rates, referred to in the art as the "granularity" of the policing function.

3.3 It was common ground between the parties (see eg the prior art acknowledged at column 2, lines 8 to 51 of the patent in suit) that one known method of policing data rates is the so-called "leaky bucket" detector, in which every time a packet on a specific virtual channel is detected a counter is incremented and at set times the counter is decremented; thus, if the maximum allowed data rate is exceeded for a period of time the counter will be incremented faster than it can be decremented and will give an overflow signal, leading to interruption in the data flow. As noted above, a single "leaky bucket" detector could be used for all virtual circuits but would mean that an individual user could abuse the system without being detected. If individual virtual circuits are policed the problem arises that this must be done at very high speed because of the high data rates involved. A fast memory and fast processing circuitry are required.

3.4 It was also common ground that it is known in the prior art to provide a policing function for each virtual channel using a counter as described above; the appellant acknowledges that D2 relates to a method of ATM transmission with a policing arrangement for individual virtual channels as described above and has delimited claim 1 of all three requests with respect to this document; the Board would observe that D1 also discloses the features of the preamble of claim 1 of all three requests.

4. *Novelty and inventive step (main request)*

4.1 Claim 1 of the main request is in essence characterised by controlling the counter in such a way that the count is decreased in dependence on the time interval since

reception of the last cell in the same virtual circuit, times a preset parameter C1, whilst being increased by a parameter C2 determined for the specific channel if the threshold representing the permitted data rate is not exceeded. This can best be represented mathematically:

$$\text{counter state (new)} = \text{counter state (old)} - (C1 * \text{interval}) + C2$$

where C1 and C2 are the above-mentioned predetermined parameters in the form of constants and "interval" is the time between the latest cell and the previous cell for that virtual circuit.

- 4.2 Before considering the prior art the Board wishes to comment on a matter raised by the respondents. Since C1 and C2 are constants it is possible to rescale the equation to give only a single constant; for example, by dividing all terms by C2 the equation in essence becomes:

$$\text{counter state (new)} = \text{counter state (old)} - ((C1/C2) * \text{interval}) + 1$$

In other words, the counter is incremented by 1 and a value proportional to the interval between cells subtracted.

- 4.3 The Board would draw attention to the appellant's explicit acceptance that such rescaling is possible.

- 4.4 Turning now to the prior art, D1 discloses at Figure 5.3, page 62, an algorithm for a "bandwidth enforcement mechanism", ie a policing method, which is based on the equation;

counter state (new) = counter state (old) - (Avg*interval) + In

where Avg is the "drain rate of bucket", ie a constant, and In is "increment added to bucket for each incoming packet", ie another constant.

4.5 Strictly speaking, D1 refers to a "pseudo-queue", see Figure 5.1 at page 59, whereas the claims of the patent require the use of a counter. D1 moreover distinguishes between the "pseudo-queue" and the counter which is used to measure the delay between the latest and the previous packet, see pages 60 and 61. However, it is clear from page 61, first full paragraph that the pseudo-queue length QL is in the preferred embodiment stored in a register which is incremented by an arithmetic logic unit ALU. This arrangement is, in the Board's view, a counter in the same sense as used in the claims. It performs the same function as the claimed counter, namely being decremented in proportion to the time since the preceding packet and incremented (In) in proportion to the number of incoming packets on the virtual channel. The Board accordingly concludes that D1 discloses a counter in accordance with the claim.

4.6 D1 thus requires that the count be decreased on the arrival of a data cell by a value which is the product of a constant and the length of time between the moment of arrival of that data cell and the moment of arrival of a preceding data cell with the same channel indication. In accordance with page 59, first paragraph of D1 the parameters could be stored in a memory, which implies a channel specific parameter. Also in accordance with the equation of Figure 5.3 the state of the counter is increased by a second constant value

"In" which is the increment added to the bucket for each incoming packet. Although not explicitly stated in D1 it is implicit in such an arrangement that the count is only incremented if it is below the threshold value.

- 4.7 It was argued by the patentee that although Figure 5.3 of D1 showed an equation with two constants it also showed that the preferred value for In was 1, which could not be described as "previously recorded channel specific parameter" within the terms of the claim. The Board accepts that the preferred value for In in D1 is indeed 1, this being the simplest form of addition, but nevertheless the general form of the equation makes clear that it was understood that there are in fact two constants. Moreover, as has been discussed above, the value of the second constant can be rescaled to 1 by division of the entire equation by In giving

$$\text{counter state (new)} = \text{counter state (old)} - ((\text{Avg}/\text{In}) * \text{interval}) + 1$$

ie, a single constant to which a unitary increment is added.

- 4.8 Although the opposition division concluded that claim 1 lacked an inventive step having regard to the disclosure of D1, it is apparent from the above discussion that in the Board's view the correct conclusion is that the claim lacks novelty (Article 54 EPC). It is noted that the originally filed oppositions both alleged a lack of novelty as well as lack of inventive step, although it is apparent from the minutes of the oral proceedings that this objection was not maintained. The Board's finding of lack of novelty is therefore not to be considered "a fresh ground for opposition" as discussed in decisions G 1/95 and G 7/95

of the Enlarged Board of Appeal (OJ EPO 1996, 615 and 626). It is accordingly not necessary to seek the agreement of the patentee to the introduction of the ground of lack of novelty into the proceedings. Finally, as pointed out by the Enlarged Board in decisions G 1/95 and G 7/95, at points 7.1 and 7.2, although an objection of lack of novelty is a different legal objection having a different legal basis from the objection of lack of inventive step, "Nevertheless ... if the closest prior art document destroys the novelty of the claimed subject-matter, such subject-matter obviously cannot involve an inventive step. Therefore, a finding of lack of novelty in such circumstances inevitably results in such subject-matter being unallowable on the ground of lack of inventive step".

4.9 For the sake of completeness the Board wishes also to consider the preferred method of D1 as shown in Figure 5.4. At page 59, last paragraph and page 60, first paragraph the problem caused by implementation of the Figure 5.3 algorithm, namely the requirement for high-speed multiplication, is discussed. The proposed solution to this problem is given by Figure 5.4 and requires rescaling of the algorithm so that the multiplication is unnecessary; in other words, the first constant is given a unitary value. This is the preferred arrangement of the patent in suit, see column 5, lines 28 to 37, column 7, line 55 to column 8 line 5 and claim 11 of the granted patent. In accordance with Figure 5.4, rescaling gives the following algorithm:

counter state (new) = counter state (old) - interval + In

The above equation fulfils the requirement of the characterising part with the "first constant value" set to 1. The Board accordingly concludes that claim 1 of the main request also lacks novelty having regard to the disclosure of the Figure 5.4 method of D1.

5. *Novelty and inventive step (first auxiliary request)*

5.1 Claim 1 of the first auxiliary request differs from that of the main request in being additionally limited by the constant C1 or C2 not being equal to 1. As will be clear from the above discussion the Figure 5.3 algorithm of D1 covers the case where C1 is not equal to 1, whilst the Figure 5.4 algorithm covers the case where C2 is not equal to 1.

5.2 The subject-matter of claim 1 of the first auxiliary request accordingly lacks novelty.

6. *Novelty and inventive step (second auxiliary request)*

6.1 Claim 1 of this request adds to claim 1 of the main request that the length of time between the arrival of data cells "is determined with a previously recorded channel specific resolution". In other words, the accuracy with which the length of time is determined depends on the capacity of the channel; in practical terms this means that the clock rate is proportional to the channel rate. D1 appears to have a fixed clock rate; in accordance with page 61, last paragraph a 32 bit register is required to support connections "of bandwidth ranging from 20 000 packets per second to about 1 packet per day". The provision of a 32 bit register implies a counter which can cope with this entire range. Such an arrangement gives rise to the

problem of requiring a substantial number of bits; an obvious solution to the problem would be to provide for a plurality of counter rates, these being associated with specific virtual channels and stored, a lower bit resolution then being required. D2 is an example of the use of such a counter mechanism; Figure 5 of D2 shows, in the context of a leaky-bucket detector as in D1 and the patent, the provision of a memory C3 which by means of 2 bits enables a time base and clock circuit BTC to operate at one of four different rates. Reference is also directed to claim 1 of D2, which explicitly states that each communication is allocated a predetermined clock frequency. It would therefore be obvious to solve the problem of resolution in the D1 arrangement by the provision of a variable clock rate as in D2.

6.2 The subject-matter of claim 1 of the second auxiliary request accordingly lacks an inventive step (Article 56 EPC).

7.1 In the course of the oral proceedings the appellant argued that the arrangement of the patent gave rise to a major advantage over the prior art as represented by D1 and D2 in that it enabled an important parameter in the policing of ATM mode transmissions to be more accurately determined, namely granularity. Granularity referred to the number of specific data rates which were stored in the detector for comparison purposes, the International Telecommunication Union (ITU) having recommended that the measurement process be accurate to 1% or less. The arrangement disclosed in D1, having only a single constant, would not permit such accuracy over more than a very limited range; the appellant contended that D1 would only permit a range of 1:100 whereas a realistic range was 1:100 000. Admittedly D2

permitted a wider range to be achieved but did so at the cost of a very considerable increase in complexity because of the number of counters involved. Even so the degree of flexibility was not comparable with that achieved by the method of the patent.

7.2 The Board accepts that the use of two constants as in the patent can be used to improve the granularity of a policing method but notes that the patent itself contains no mention of granularity or of the advantages which are obtained by the use of two constants. Indeed, as noted above the preferred arrangement makes use of only a single constant as in D1. Moreover, claim 1 of all requests will because of rescaling inevitably embrace embodiments in which only a single constant is used.

8.1 Since claim 1 of each request has been found not to be allowable, it follows that the requests as a whole are not allowable. It is however observed that claim 8 of each request is an independent apparatus claim based on the same subject-matter as claim 1 of the respective request and is therefore open, *mutatis mutandis*, to the same objection.

8.2 There being no allowable request, it follows that the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

S. Steinbrener