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Datasheet for the decision of 24 July 2008

Case Number: T 0338/06 - 3.5.05

Application Number: 01914758.6

Publication Number: 1247384

IPC: H04L 29/06

Language of the proceedings: EN

Title of invention:
Effective protocol for high-rate, long-latency, asymmetric, and bit-error prone data links

Applicant:
RAYTHEON COMPANY

Opponent:
-

Headword:
Negative Acknowledgement Protocol/RAYTHEON

Relevant legal provisions:
EPC Art. 52(1)

Relevant legal provisions (EPC 1973):
EPC Art. 56, 111(1)

Keyword:
Inventive step (main request and auxiliary request - no)

Decisions cited:
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Catchword:
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Case Number: T 0338/06 - 3.5.05

D E C I S I O N
of the Technical Board of Appeal 3.5.05
of 24 July 2008

Appellant: RAYTHEON COMPANY
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 04 November 2005 refusing European application No. 01914758.6 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: D. H. Rees
Members: M. Höhn
G. Weiss

Summary of Facts and Submissions

I. This is an appeal against the decision of the examining division dated 4 November 2005 to refuse application number 01914758.6. The decision was based on prior art documents

D1: FOX R: "RFC 1106: TCP BIG WINDOW AND NAK OPTIONS", [Online] 1 June 1989 (1989-06-01), USA; Retrieved from the Internet: <URL:http://www.strategis.com/rfc/RFC11XX/RFC1106.TXT> [retrieved on 1998-07-09],
D2: US 5754754 A,
D3: US 5727002 A.

According to the decision independent claim 1 of the application lacked novelty (Article 52(1) with Articles 54(1) and (2) EPC 1973) over prior art document D3. It was further remarked that the dependent claims 2 to 12 either lacked novelty or inventive step (Article 56 EPC 1973) in the light of the disclosure of prior art documents D1 to D3.

II. In the statement of grounds of appeal it was requested that the decision under appeal be set aside and "to agree to the patentability of the present invention". Oral proceedings were requested on a precautionary basis in the notice of appeal.

III. With a communication dated 16 April 2008 the board summoned the appellant for oral proceedings to be held on 24 July 2008 in accordance with the appellant's request. In the annex to the summons the board expressed the preliminary opinion that the subject-

matter of independent claim 1 did not satisfy the requirements of Article 84 EPC 1973 and Article 123(2) EPC and in addition was anticipated by document D3 or at least obvious in the light of document D2 or in the light of D3 when combined either with the skilled person's common general knowledge or with the teaching of D2 (Article 56 EPC 1973).

IV. On 24 June 2008 the appellant filed an amended set of claims 1 to 10 forming a new main request. It was indicated that the claims had been amended to overcome the board's clarity objections. Otherwise, no arguments against the board's preliminary opinion were presented. The appellant further requested to remit the case on the basis of the new main request.

V. On 23 July 2008 the appellant filed a further amended set of claims 1 to 9 as an auxiliary request. No further arguments were presented. The appellant requested to remit the case on the basis of the main request or the auxiliary request since an examination concerning inventive step had not been carried out properly before the first instance.

VI. Independent claim 1 of the main request reads as follows:

"1. A system (10) for efficiently and reliably communicating over a high-speed asymmetric communications link (58, 60) between a first device (12) and a second device (14), comprising:
first mechanism (18, 34, 36, 48) assigned to said first and second devices (12, 14) for establishing a communications link between said first device (12) and

said second device (14) over a channel, the first device (12) including a transmit buffer (22) for transmitting the packets, and the second device (14) including a receive buffer (46) for receiving the packets;
second mechanism (18, 22, 46, 44, 34) assigned to said first and second devices (12, 14) for delivering windows of packets over the channel (60) from the first device (12) to the second device (14), a window of packets being formed by a predetermined number of packets, and for delivering packets over the channel (58) from the second device (14) to the first device (12); and
third mechanism (18, 34, 36) assigned to said second device (14) for employing the second mechanism (18, 22, 46, 44, 34) to send acknowledgement messages from the second device (14) to the first device (12) after receipt of each window of packets specifying the packets not received by the second device (14) and to re-send after each window of packets the specified data packets from said first device (12) to said second device (14) in response to the acknowledgement messages, the third mechanism (18, 34, 36) including mechanism for timing (18, 34, 36) transmissions of the message in accordance with each window of packets and providing the message from the second device (14) to the first device (12) via the second mechanism (18, 22, 46, 44, 34) in response thereto."

VII. Independent claim 1 of the auxiliary request further specifies the second mechanism by the window of packets "being sized in accordance with a data rate of the channel and a round trip signal travel time associated with the channel".

VIII. Oral proceedings were held on 24 July 2008 during the course of which the appellant presented arguments in favour of an inventive step of the independent claims and requested that the decision under appeal be set aside and the case be remitted to the department of first instance for further prosecution on the basis of the set of claims 1 to 10 filed on 24 June 2008 as main request or of the set of claims 1 to 9 filed on 23 July 2008 as the auxiliary request.

IX. After deliberation the board announced its decision.

Reasons for the Decision

1. **Main request**

2. Inventive Step

2.1 Claim 1 is directed to "a system for efficiently and reliably communicating over a high-speed asymmetric communications link between a first device and a second device." The need for high-speed asymmetric communication links is indisputably well-known, e.g. in aircraft-to-ground and satellite communications systems. The problem faced by the skilled person starting from this need is how to implement such a system reliably, which requires error-handling, and efficiently, with the constraint that the link is asymmetric, which in the present context means that the bandwidth of the back-channel from data receiver to data sender is limited.

2.2 D2 concerns the problem of providing a high performance error recovery system which performs efficiently in a wide range of data communication environments (col.2 l.46-49). The skilled person faced with the problem above would therefore take document D2 into consideration. D2 describes a number of variants on a selective acknowledgement scheme. In particular it describes the return of an acknowledgement ("status") packet after a selected number of data packets, i.e. a window as claimed, have been received (col.11 l.10-13). Moreover the acknowledgement packet may indicate the packets not correctly received from the sender (col.8 l.12-17). The skilled person would recognise that the use of these features would satisfy the limited back-channel bandwidth constraint and adopt them without the exercise of inventiveness. The board notes that in the course of the procedure the appellant has disputed that D2 discloses such negative acknowledgements. However this assertion was not maintained in the oral proceedings.

2.3 It is clear to the skilled person that such a scheme requires the use of buffers at the sender and at the receiver; the receive buffer is explicitly discussed in D2 (e.g. col.2 l.15-22) and since data packets clearly have to be stored at the sender in order to be retransmitted if necessary, a transmit buffer is implicit. Apart from the buffers the "first mechanism" of claim 1 is merely the means necessary to set up a communication channel from sender to receiver, evidently necessary for such a communications link.

2.4 The "second mechanism" is merely the means for delivering windows of packets from sender to receiver

and packets from receiver to sender, a self-evident necessity which is clearly implicit in D2.

2.5 The "third mechanism" relates only to the nature of the acknowledgement packets, i.e. that they specify the packets not correctly received, when they are sent, i.e. after each window, what is resent, i.e. the specified data packets and when, i.e. "after each window of packets". The first three of these features have already been dealt with. As to when the packets are resent, the appellant has argued that this feature achieves the advantage that large buffers and complicated means for restructuring the data can thereby be avoided (see e.g. p.5 section 3 last paragraph of the statement of grounds of appeal). However, it would anyway be obvious from D2 to provide this feature, since D2 states that it is desirable that lost data be retransmitted as soon as possible not only in the specific case of positive acknowledgements (col.10 l.29-31) but also in general (col.3 l.32-33). The reason given is "to prevent accumulation of data in the buffer memory of the receiver station" (col.3 l.34-35), i.e. for the same reason as in the claimed invention. Thus the board concludes that the skilled person would also adopt this feature in the context of negative acknowledgements.

2.6 D2 further discloses a data flow control mechanism based on a transmission window (see e.g. col.8 l.40 to col.9 l.44; in particular col.8 l.52-56), i.e. a mechanism for timing transmissions as specified in the last feature of claim 1. This feature is presented in D2 as an advantageous option which is independent of the particular options chosen for the acknowledgement

packets. It would therefore not require an inventive step to include this feature.

2.7 Hence the board considers the subject-matter of claim 1 obvious in the light of the disclosure of D2 (Article 52(1) EPC and Article 56 EPC 1973). The main request is therefore not allowable.

3. **Auxiliary request**

3.1 Claim 1 of this request further specifies how the size of the window of packets is chosen (see section VII above). According to the appellant's arguments presented during oral proceedings, this feature solves the problem of optimizing the size of the buffers.

The board has doubts that this is a question of optimization although the board agrees that there is a mutual dependency between the size of the buffer and the size of the window of packets. The board considers rather that there is a minimum window size required to keep data flowing. This is the problem solved by the additional feature.

3.2 The appellant argues that D2 does not show how to set the size of the window of packets. However, D2 discloses how to prevent buffer overflow in the light of a limited re-sequencing buffer memory capacity depending on a data transmission rate and the roundtrip delay time (see col.2, 15-22). The size of the buffer according to the board's understanding is clearly linked to the size of the transmission window (see D2, e.g. in col.2, l.8-9) because D2 mentions data being "in-flight" (col.2, l.19 and 21) the amount of which is

clearly limited by the window size. D2 suggests setting the size of the buffer in consideration of the same parameters as claimed, i.e. a data rate of the channel and a round trip signal travel time associated with the channel. As mentioned above, the board considers the setting of the size of the window of data packets according to these parameters an immediate effect of the requirement of keeping data flowing, i.e. "in-flight" according to D2. Therefore D2 suggests the same measure having the same technical effect as the additional feature of claim 1 of this request, the subject-matter of which is considered obvious for the skilled person in the light of the whole disclosure of D2. The auxiliary request is therefore not allowable.

3.3 The board notes that the additional feature of claim 1 is also known from pertinent prior art document D1 (see section 4.1, first paragraph "Window size and Nak benefits") where it is used for the same purpose. The skilled person would look into document D1 and consider this feature in order to keep data flowing.

3.4 The board therefore also considers the subject-matter of claim 1 obvious in the light of document D2 when combined with the teaching of document D1 (Article 52(1) EPC and Article 56 EPC 1973), this consideration being relevant to the question of remittal below.

4. Remittal to the first instance for further prosecution

In comparison with the set of claims on which the appealed decision is based in the appeal procedure the appellant has amended the independent claim by the introduction of features from the dependent claims (the

subject-matter of dependent claim 2 for the main request and, in addition, of dependent claim 3 for the auxiliary request) already considered in the first instance (see sections 3.1 to 3.3 of the reasons of the appealed decision and sections 4.1 and 4.2 of the communication dated 2 May 2005 where document D1 was cited for the additional feature of dependent claim 3). The appellant therefore had the possibility to present his arguments for the subject-matter claimed before two instances. In exercising its discretion under Article 111(1) EPC, the board therefore does not see a reason for a remittal of the case.

5. Since there is no allowable request the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

K. Götz D. H. Rees