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**Datasheet for the decision  
of 9 June 2009**

**Case Number:** T 0084/06 - 3.5.05

**Application Number:** 03290174.6

**Publication Number:** 1331770

**IPC:** H04L 12/56

**Language of the proceedings:** EN

**Title of invention:**

System and method for reassembling packets in a network element

**Applicant:**

Alcatel Canada Inc.

**Opponent:**

-

**Headword:**

System and method for reassembling packets/ALCATEL

**Relevant legal provisions:**

EPC Art. 52(1)  
RPBA Art. 15(3)

**Relevant legal provisions (EPC 1973):**

EPC Art. 56, 84, 113(1)  
EPC R. 71(2)

**Keyword:**

"Lack of support - (yes)"  
"Inventive step - (no)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0084/06 - 3.5.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.05  
of 9 June 2009

**Appellant:** Alcatel Canada Inc.  
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**Representative:** Feray, Valérie  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 29 July 2005  
refusing European application No. 03290174.6  
pursuant to Article 97(1) EPC 1973.

**Composition of the Board:**

**Chairman:** D. H. Rees  
**Members:** P. Corcoran  
G. Weiss

## Summary of Facts and Submissions

- I. This is an appeal against the decision of the examining division dated 29 July 2005 to refuse the European patent application No. 03290174.6 published as No. 1331770.
- II. The decision under appeal was based on a set of claims 1-20 filed with the letter of 12 October 2004. The examining division found that an amendment to the description filed with the letter of 12 October 2004 infringed Article 123(2) EPC. Said amendment comprised the addition of a passage of text to p.11 of the description. The examining division further found that even if the aforementioned amendment to the description were removed as proposed by the applicant in the letter dated 7 June 2005, (cf. point 1.3 of said letter), the subject-matter of claim 1 lacked inventive step based on a combination of the following documents:
- D1: US 5 497 371 A;  
D2: EP 1 137 227 A.
- III. In the statement setting out the grounds of appeal, the appellant requested that the decision under appeal be set aside and a patent granted on the basis of a new set of claims 1-16 replacing the previous claims on file. A precautionary request for oral proceedings was also made.
- IV. In a communication accompanying a summons to oral proceedings to be held on 9 June 2009 the board set out its preliminary opinion concerning the appeal and referred to the following further prior art documents

which it introduced into the proceedings of its own motion:

- D3: L. KLEINROCK, "QUEUEING SYSTEMS, VOLUME II: COMPUTER APPLICATIONS", pp.422-439, 1976, John Wiley & Sons, ISBN: 0-471-49111-X (v.2);
- D4: N. GIROUX & S. GANTI: "Quality of Service in ATM Networks: State of the Art Traffic Management", Chapters 2, 5 and 7, pp.10-32, 85-121, 165-179, 1999, Prentice Hall PTR, ISBN: 0-13-095387-3.

D3 and D4 are extracts from textbooks cited as evidence of general technical knowledge.

V. In said communication, the board expressed its preliminary opinion that the appellant's request was not allowable. In particular, the board expressed the opinion that the claims did not satisfy Article 84 EPC 1973 and that, further, the subject-matter of the independent claims lacked an inventive step over the prior art acknowledged in the application because the claimed subject-matter was obvious in the light of general technical knowledge and routine design skills as evidenced by D3 and D4. An additional inventive step objection was raised based on D2 as the closest prior art. The board also noted that it was not convinced that the appellant's submissions with respect to D1 were sufficient to overcome an inventive step objection starting from that document.

VI. In letter dated 28 April 2009 and sent by telefax on the same date, the appellant's representative informed the board that the appellant had decided neither to attend nor to be represented at the scheduled oral

proceedings. No submissions or amendments in response to the issues raised in the communication were received.

VII. The appellant has requested that the decision under appeal be set aside and that a patent be granted on the basis of the following set of claims:

Claims 1-16 as filed with the statement setting out the grounds of appeal.

The further documents on which the appeal is based, i.e. the text of the description and the drawings, are taken to be as follows:

Description, pages:

2-5, 9-14 as originally filed;

1, 1a, 6, 7, 8, 15, 16 as filed with letter of 12 October 2004.

Drawings, sheets:

1/9-9/9 as originally filed.

VIII. Claim 1 of the appellant's request reads as follows:

"A method of reassembling packets (306a, 306b, 306c, 306d, 306f, 306g) in a network element (100), wherein the packets (306a, 306b, 306c, 306d, 306f, 306g) are associated with a plurality of traffic flows, each traffic flow has a size constraint parameter indicating a sizing constraint for its packets, some of the traffic flows are associated with packets (306a, 306e, 306f) that are small relative to packets (306a, 306b) of other variable-size traffic flows, incoming packets (306a, 306b, 306c, 306d, 306f, 306g) are segmented for processing within the network element, and after processing within the network

element segmented packets (250) are sent for reassembly to one of a plurality of reassembly queues (302a, 302b, 302c, 320) shared among various traffic flows, characterized in that the traffic flows are grouped into a plurality of groups utilizing the packet size parameter of each traffic flow, and a group of traffic flows associated with packets (306a, 306e, 306f) that are small compared to the packets (302a, 302b) of the other variable-size traffic flows is separated from the other traffic flows and sent to at least one reassembly queue (320) designated for handling small size packets."

Claim 10 of the appellant's request reads as follows:

"A reassembly module (300) for reassembling packets (306a, 306b, 306c, 306d, 306f, 306g) in a network element (100), wherein the packets (306a, 306b, 306c, 306d, 306f, 306g) are associated with a plurality of traffic flows, each traffic flow has a size constraint parameter indicating a sizing constraint for its packets, some of the traffic flows are associated with packets flows (306a, 306e, 306f) that are small relative to packets (306a, 306b) of other variable-size traffic flows, and incoming packets are segmented for processing within the network element, comprising a plurality of reassembly queues (302a, 302b, 302c, 320) shared among various traffic flows for reassembling the segmented packets after processing within the network element, and characterized in that it further comprises a classification module (500) for grouping the traffic flows into a plurality of groups utilizing the packet size parameter of each traffic flow, means for

identifying said traffic flows of said one group on the basis of said packet size parameter of each said traffic flow, and a transmission module (502) for sending segmented packets only from traffic flows of one group of said plurality of groups to at least one reassembly queue (320) designated for handling small size packets."

IX. At the end of the oral proceedings the chairman announced the board's decision.

### **Reasons for the Decision**

#### 1. *Non-appearance at oral proceedings*

1.1 Neither the appellant nor its representative attended the oral proceedings to which the appellant had been duly summoned, (cf. Facts and Submissions, points IV. and VI. above).

1.2 In the present case, the board judged that it was appropriate to proceed by holding the oral proceedings as scheduled in the absence of the appellant, (Rule 71(2) EPC 1973), particularly in view of the fact that the appellant had not withdrawn the precautionary request for oral proceedings but had merely notified the board of its intention not to attend the scheduled proceedings.

1.3 The appellant could reasonably have expected that during the oral proceedings the board would consider the objections and issues raised in the communication annexed to the summons to oral proceedings, (cf. point V. above).

In deciding not to attend the oral proceedings, the appellant effectively chose not to avail of the opportunity to present its observations and counter-arguments orally but instead to rely on its written case, (Article 15(3) RPBA).

- 1.4 It is further noted that the appellant did not submit any substantive written response to the issues raised by the board in its communication. Therefore, the appellant's written case corresponds to that presented in the statement setting out the grounds of appeal.
  
- 1.5 The board concludes that the appellant had an opportunity to present comments on the grounds and evidence on which the board's decision, arrived at during oral proceedings, is based. The right to be heard under Article 113(1) EPC 1973 has thus been satisfied despite the appellant's non-attendance at the oral proceedings.

## 2. *Preliminary observations*

- 2.1 According to a preferred embodiment of the invention, traffic from single-cell packet traffic flows is concentrated onto one (or more) dedicated reassembly queues and thereby segregated from variable-size packet traffic flows, (cf. [0035] of the published application). More generally, the assignment of traffic flows to designated reassembly queues can be based on a packet size parameter corresponding to the upper-bound of a variable-size packet traffic flow, (cf. [0064]).
  
- 2.2 Claims 1 and 10 specify that there are a plurality of traffic flows each with an associated size constraint



parameter and that some of the traffic flows are associated with packets that are small relative to other variable-size traffic flows. Said claims likewise specify that at least one reassembly queue is designated for handling "small size" packets.

2.3 The wording of claims 1 and 10 does not explicitly mention single-cell packet traffic flows but is understood to encompass embodiments where single-cell packet traffic flows are segregated from variable length packet traffic flows as well as embodiments where variable length packet traffic flows are segregated from each other on the basis of an specified packet size parameter.

3. *Article 84 EPC 1973*

3.1 The current wording of claims 1 and 10 implies that all incoming packets are segmented and reassembled. However, in the case of "single-cell packets" there is no apparent segmentation and reassembly. Such packets are merely converted into the internal cell format by mapping the cell payload and header and adding an appropriate internal header, (cf. [0031] of the published application). As such, no segmentation of the packet is performed at the ingress stage and no reassembly is required at the egress stage, merely the removal of the internal header.

In view of the foregoing, the board finds that, since claims 1 and 10 encompass embodiments including single-cell packet traffic flows, the wording of said claims

which implies that all incoming packets are segmented and reassembled is not supported by the description.

3.2 The expression "said one group" as used in independent claim 10 and dependent claims 2, 3, 5, 11, 13, 15 and 16 lacks an antecedent basis as does the expression "said at least one group" used in dependent claim 9. This results in a lack of clarity in the wording of said claims.

3.3 In view of the foregoing, the board finds that the request fails to comply with the requirements of Article 84 EPC 1973.

#### 4. *Inventive step*

4.1 In principle, the objection against claims 1 and 10 due to lack of support noted in 3.1 only arises because said claims encompass embodiments including single-cell packet traffic flows. However, the board finds that even if said embodiments are excluded and the further clarity objection against claim 10 noted under 3.2 is disregarded, the claimed subject-matter lacks an inventive step as detailed below.

4.2 In the board's judgement, the background art acknowledged in [0002]-[0003] of the published application represents the most appropriate starting point for an assessment of inventive step.

4.3 According to the aforementioned background art, it was known to provide network elements such as switches and routers for supporting a plurality of traffic flows

including frame-based and single-cell packet traffic flows, (cf. [0002]). It is further stated that in existing network elements, reassembly queues are typically shared between all traffic flows. As a consequence, traffic flows comprising smaller packets, in particular single-cell packet traffic flows, are liable to suffer from delays as they are required to wait for the reassembly of larger packets, (cf. [0003]).

From this it may be inferred that a reassembly module comprising the features of the pre-characterising part of claim 10 was known at the claimed priority date. Such a reassembly module did not comprise a classification module and a transmission module as recited in the characterising part of claim 10.

- 4.4 The features of claim 10 which distinguish it from the aforementioned background art are its characterising features which provide the technical effect of improving the throughput efficiency for traffic flows comprising smaller packets. This effect follows as a consequence of eliminating or at least reducing the contention for reassembly storage resources between small packet and large packet traffic flows.
- 4.5 The objective technical problem vis-à-vis the aforementioned prior art may be formulated as how to modify the existing reassembly module so as to reduce interference between traffic flows having substantially different packet sizes. The board judges that the claimed solution does not require the exercise of inventive skill for the reasons which follow.

4.6 By monitoring and analysing the progress of traffic flows through the network element using conventional techniques the skilled person would detect without undue difficulty that traffic flows comprising small message units suffer a decrease in throughput due to resource contention with traffic flows comprising larger message units.

The board notes that it is generally known that where a large number of traffic flows contend for shared reassembly resources the throughput tends to decrease significantly as the number of sub-units per message increases. In support of this assertion reference is made to D3, in particular Figs. 6.7-6.9 and the accompanying text on p.435-438.

In the given circumstances, the recognition of the underlying problem does not require the exercise of inventive skill because the problem relates to a shortcoming of the prior art device which would be readily identifiable in practice, *viz.* a decrease in throughput for small packet traffic flows due to contention for reassembly resources with larger packet traffic flows.

4.7 Having recognised the shortcoming of the prior art device, the skilled person would be motivated to search for a solution to eliminate or at least reduce the contention between the two aforementioned classes of traffic flow.

4.8 In the field of network traffic management, it corresponds to conventional practice to provide queuing structures at contention points. It is also a conventional aim to design such queuing structures to

reduce interference among service classes and traffic flows ("connections"). In support of these assertions reference is made to D4, (cf. D4: Chapter 5 - *Queuing and Scheduling*, in particular, p.85).

It is likewise generally known to organise queuing structures such that traffic flows ("connections") are categorised into groups whereby cells from each group are queued up separately, (cf. D4: Chapter 5, in particular p.92). Under such an arrangement, it represents normal design practice to partition the available buffer memory space among the queuing structures, (cf. D4: Chapter 6, in particular section entitled *Buffer-Partitioning Policies*, p.167 *et seq.*).

- 4.9 In the given context, traffic flows comprising relatively small packets and traffic flows comprising relatively large packets constitute obvious logical groups of traffic flows when due account is taken of their inherent throughput characteristics, (cf. 4.6 above).

When modifying the prior art reassembly module in the light of the requirement to eliminate or reduce resource contention between competing classes of traffic flow the skilled person would, in the board's judgement, arrive at a reassembly module comprising the features of claim 10 without the exercise of inventive skill. The modifications leading to this result follow in a straightforward manner from the application of the generally known principles of per-group queuing and buffer space partitioning.

4.10 The board therefore concludes that the skilled person would have identified the underlying technical problem without the exercise of inventive skill and in attempting to solve this problem would have arrived at the subject-matter of claim 10 merely by using general technical knowledge and routine design skills. The claim thus fails to comply with the inventive step requirements of Article 52(1) EPC and Article 56 EPC 1973. A similar objection applies *mutatis mutandis* against claim 1.

5. Due to the deficiencies noted under 3. and 4. above the appellant's request fails to comply with the requirements of the EPC. In the absence of an allowable request the appeal must be dismissed.

6. *Obiter Dictum*

6.1 In the communication accompanying the summons to oral proceedings the board raised an additional inventive step objection starting from D2 as the closest prior art, (cf. communication point 7.). In view of the inventive step objection detailed under 4. above, it is not necessary for the board to give further consideration to this additional objection.

6.2 For the sake of completeness, it is noted with respect to the aforementioned objection based on D2 that the appellant made no submissions in response to the relevant argumentation as set out in the board's communication. The board therefore sees no reason for revising its preliminary opinion that D2 may also be considered prejudicial to the inventive step of the claimed subject-

matter, when due account is taken of general technical knowledge and routine design skills.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

K. Götz

D. H. Rees