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**D E C I S I O N**  
**of 17 October 2000**

**Case Number:** T 0805/99 - 3.5.1

**Application Number:** 98301335.0

**Publication Number:** 0863650

**IPC:** H04M 3/50

**Language of the proceedings:** EN

**Title of invention:**

Waiting-call selection based on anticipated wait times

**Applicant:**

LUCENT TECHNOLOGIES INC.

**Opponent:**

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**Headword:**

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**Relevant legal provisions:**

EPC Art. 52(1), 56

**Keyword:**

"Inventive step (no)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0805/99 - 3.5.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.1  
of 17 October 2000

**Appellant:** LUCENT TECHNOLOGIES INC.  
600 Mountain Avenue  
Murray Hill, New Jersey 07974-0636 (US)

**Representative:** Buckley, Christopher Simon Thirsk  
Lucent Technologies (UK) Ltd  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 21 June 1999  
refusing European patent application  
No. 98 301 335.0 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** P. K. J. van den Berg  
**Members:** A. S. Clelland  
P. Mühlens

## Summary of Facts and Submissions

I. This appeal is against the decision of the Examining Division to refuse application No. 98 301 335.0 on the grounds that the subject-matter of independent claims 1 and 8 was not clear and, insofar as it could be understood, lacked an inventive step. The decision *inter alia* cited the following document:

D1: US-A-5 506 898

II. The appellant (applicant) lodged an appeal against this decision and paid the prescribed fee. In the subsequently filed statement of grounds the appellant argued that the claims rejected by the Examining Division were both clear and inventive; a revised set of claims of an auxiliary request was filed, to be considered by the Board should the arguments as to clarity not be accepted.

III. In a communication from the Board, *inter alia* objection was raised of lack of clarity of the independent claims of both requests, and of lack of inventive step. In response, the appellant filed revised claims of new main and auxiliary requests. It was argued that the claims of both requests were clear and their subject-matter involved an inventive step.

IV. The appellant's main request is that the decision under appeal be set aside and a patent granted on the basis of the following documents:

**Claims:** 1 to 9 filed on 8 June 2000;

**Description:** page 4 as originally filed;  
pages 1a, 2, and 3 as filed on 3 March  
1999;  
pages 1 and 5 as filed on 15 May 1999

**Drawings:** single sheet as originally filed

As an auxiliary request the above claims are replaced  
by further claims 1 to 9, also filed on 8 June 2000.

Claim 1 of the main request reads as follows:

"A method of selecting one of a plurality of waiting  
communications that are available to be selected, said  
method comprising the steps of estimating how long a  
communication will have to wait before being selected;  
characterized by:

the step of estimating comprising the step of

anticipating (204-210) how long each one of the  
plurality of communications will have waited to be  
selected if said communication is not selected first  
from among the communications, by

determining (206) how long each communication has  
been waiting to be selected,

determining (208) how long each communication is  
likely to wait to be selected if said communication is  
not selected first, and

for each communication, combining (210) the  
determinations made for said communication to obtain  
the anticipated wait time for said communication; and

the method comprising the step of

first selecting (212) the one of the communications that has a longest anticipated wait time."

Claim 1 of the auxiliary request reads as follows:

"A method of selecting one of a plurality of waiting communications that are available to be selected in a system for automatic distribution of communications from incoming queues to processing agents, said method comprising the steps of estimating how long a communication will have to wait before being selected, characterized by:

the step of estimating comprising the step of

anticipating (204-210) how long each one of the plurality of communications will have waited to be selected if said communication is not selected first from among the communications, by

determining (206) how long each communication has been waiting to be selected,

determining (208) how long each communication is likely to wait to be selected if said communication is not selected first, and

for each communication, combining (210) the determinations made for said communication to obtain the anticipated wait time for said communication; and the method comprising the step of

first selecting (212) the one of the communications that has a longest anticipated wait time every time that a processing agent becomes free for processing a communication."

Claim 8 of each request is an independent apparatus

claim having features corresponding to those of the respective method claim.

### **Reasons for the Decision**

1. Automatic call-distribution systems are widespread in the modern world and are designed to distribute incoming calls to agents equipped to deal with them. In its simplest form such a system stacks the incoming calls and distributes them to the agents on a first-in first-out basis. In a more sophisticated version different queues may be provided based on predetermined criteria: for example (not taken from the application), a software house might have a system in which existing customers are invited to press "1" for support whilst new customers wishing to register press "2". In such a system all agents could process registrations but only specialised agents would be trained to handle support. A pure first-in first-out system for each queue would not take into account that the support agents can also process registrations.
2. One known answer to this problem is to monitor the length of time the call at the head of each queue has been waiting and when an agent becomes available, select the call which has been waiting longest and which the particular agent is competent to deal with.
3. The application states that this procedure gives rise to a problem when wait time for one queue (eg the "registration" queue) is compared with that of a queue requiring a specialised skill (eg the "support" queue); in the former case many agents may be competent whereas the latter queue may be serviced by fewer agents and

may move more slowly than the main queue. This can give rise to the problem that the call at the head of the first queue may have been waiting longer than the call at the head of the specialised queue and should be taken by the next agent to become available; however, because the specialised queue moves more slowly the result would be that the call at the head of the specialised queue has to wait much longer until an agent becomes available, whereas if it were taken first - out of order so to speak - the call at the head of the first queue would wait a much shorter time because more agents are available to deal with it and the rate of movement is therefore faster.

4. *Inventive step*

4.1 In its communication the Board raised questions as to the clarity and support of the independent claims of the then main request. Objection of lack of clarity was also raised by the Examining Division in the impugned decision, based on a lack of "essential features" in the independent claims. Although in the Board's view there are still outstanding questions as to the support of the claims of the main request, it is considered more profitable to consider the question of inventive step in relation to the independent claims of the auxiliary request, as these do not give rise to objection of lack of support and include all the features of the corresponding claims of the main request. Thus, the Board's conclusions on inventive step as regards claims 1 and 8 of the auxiliary request apply equally to respective claims 1 and 8 of the main request.

4.2 It is uncontested that the single most relevant

document is the appellant's earlier document D1. This document relates to an automatic call-distribution system in which calls can be placed in different queues based on some preestablished criterion. The problem to be solved is said to be that of call abandonment as a result of being queued; the solution is to estimate wait time for each call in any given queue and inform the caller. This is achieved by calculating an average rate of advance for the queue, correcting this by a weighting factor and multiplying the corrected rate of advance by the position of the call in the queue to give the wait time. The estimate can be updated regularly. Although the system is said to be advantageous when used with "multiple split/skill queuing" there is no disclosure of the mechanism used for distributing calls to agents or of the criteria used for distribution. It is stated at column 2, lines 40 to 56 that the waiting times of calls "having different priorities or destined for different splits", i.e. in different queues, may be monitored both in real time and on a historical basis, and calls may be rerouted, e.g. moved to a different queue, based upon the expected waiting times. D1 accordingly points the skilled person towards the goal of maximum efficiency by minimising the waiting times overall.

4.3 D1 has however little to say about the problem addressed in the application, namely which queue to select when any given agent becomes available. In accordance with claims 1 and 8 of the auxiliary request this problem is solved by performing an estimation of "anticipated wait time" by combining a determination of how long a call has been waiting in its queue with a determination of how long the call is likely to wait if it is not selected first. In both claims 1 and 8 the



latter determination is referenced 208, which in the flow chart of Figure 2 corresponds to the step said to "determine average rate of advance for each call queue of the determined highest priority". The Board therefore understands the claims to require a determination both of the actual wait time of a call and of the estimated wait time, followed by their combination. The call from the queue which has the longest anticipated wait time is then selected.

4.4 The skilled person implementing the D1 system is faced with the problem of how to distribute calls for processing when there is more than one queue. The obvious answer, acknowledged in the application in suit, is to select on an oldest-call-waiting (OCW) basis. In the Board's view the skilled person implementing D1 would not use OCW as the only criterion; the D1 system primarily calculates estimated wait time but as noted above also refers to "historical", i.e. actual, wait time. The Board considers that the skilled person could rather be expected to make use both of the primary criterion derived in D1, estimated wait time, and actual wait time. Once a call reaches the head of its queue it still has an estimated wait time and since this time is available the skilled person could be expected to take it into account in any calculation. Since both actual (past) and estimated (future) wait times are then available the obvious step is to combine them to give a single selection criterion.

4.5 The Board accordingly agrees with the Examining Division, who state that this feature represents "no more than one among a number of possibilities to be considered by a skilled person, when designing a

strategy for selecting queued calls in an efficient way". Given that in the light of the disclosure of D1 the strategy is an obvious one to choose, and in the absence of any particular details in claims 1 or 8 of how this strategy is implemented, the Board concludes that the subject-matter of both claim 1 and claim 8 of the auxiliary request lacks an inventive step.

- 4.6 Since as noted above the corresponding claims of the main request are of wider scope than those of the auxiliary request it follows that these claims are open to the same objection of lack of inventive step.
5. In the statement of grounds of appeal the appellant draws attention to the specific wording of claim 1 and in particular the algorithm used in selecting a call which is quoted as being "if I do not select this communication first, how long will it have to wait before it is selected?". This is said to be the key distinction over the prior art. Reference is directed by the appellant to responses to communications from the Examining Division; in these responses the claimed invention is said to differ from D1 in that this document uses the conventional call-selection criterion, namely selecting the call which has been waiting the longest rather than the call which will have waited the longest if it is not selected first. However, as noted above, Figure 2 of the application shows that what this really means is that a time is derived based on the actual time a call has waited together with a time based on the rate of advance for the particular queue. Put thus, the algorithm followed is intuitive: all other things being equal, pick the queue with the slowest rate of advance. When this is translated into a practical arrangement it can mean

nothing other than that for multiple queues the time the call at the head of each queue has been waiting is combined with the rate of advance of the queue in order to determine which call should be taken first.

6. There being no other requests, 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

P. K. J. van den Berg