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Datasheet for the decision
of 17 June 2009

Case Number: T 1760/06 - 3.5.01

Application Number: 99946689.9

Publication Number: 1133741

IPC: G06F 17/30

Language of the proceedings: EN

Title of invention:
Method and apparatus for fast and comprehensive DBMS analysis

Applicant:
Computer Associates Think, Inc.

Opponent:
-

Headword:
DBMS analysis/COMPUTER ASSOCIATES THINK

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56, 111(1)
EPC R. 67, 86(3)

Keyword:
"Inventive step - main request and first and second auxiliary requests (no)"
"Remittal - third auxiliary request"
"Reimbursement of appeal fee (no)"

Decisions cited:
-

Catchword:
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Case Number: T 1760/06 - 3.5.01

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 17 June 2009

Appellant:	Computer Associates Think, Inc. One Computer Associates Plaza Islandia, New York 11749 (US)
Representative:	Dunlop, Hugh Christopher R.G.C. Jenkins & Co. 26 Caxton Street London SW1H 0RJ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted 21 June 2006 refusing European patent application No. 99946689.9 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman:	S. Steinbrener
Members:	S. Wibergh
	P. Schmitz

Summary of Facts and Submissions

I.   This appeal is against the decision of the examining
        division to refuse European patent application
        No. 99946689.9.

II.   The following documents will be referred to:

        D1:   "Table reorganization identification", IBM
              Technical Disclosure Bulletin, XXXIV(1), 1991,
              163-5
        D2:   US-A-5 222 235
        E1:   L. Leverenz et al, "Oracle8^{TM} Server Concepts",
              Manual, Oracle Corporation 1997, pp. 1-15, 1-19,
              1-20.

III.   According to the decision appealed, the subject-matter
        of claim 1 of the then main request did not involve an
        inventive step. The two auxiliary requests were not
        admitted under Rule 86(3) EPC 1973.

IV.   With the statement setting out the grounds of appeal
        dated 30 October 2006, the appellant requested that the
        decision under appeal be set aside. Claims according to
        a new main request and three auxiliary requests were
        submitted. Refund of the appeal fee was also requested
        because of procedural violations by the examining
        division, in particular by inappropriately exercising
        its discretion under Rule 86(3) EPC 1973 when not
        admitting the then second auxiliary request into the
        proceedings (now filed as third auxiliary request).

V.   In a communication annexed to a summons to oral
        proceedings, the Board indicated that the subject-

matter of claim 1 according to the main and first two auxiliary requests appeared to be obvious having regard to a combination of D1 and D2. As to the third auxiliary request, its admissibility would be discussed at the hearing. Finally, reimbursement of the appeal fee did not seem equitable in the present case.

VI.   By letter dated 15 May 2009 the appellant filed claims according to an amended main request and an amended third auxiliary request.

VII. Oral proceedings were held on 17 June 2009. The appellant, after having presented the new document E1, requested that the decision under appeal be set aside and a patent be granted on the basis of the main request filed by letter dated 15 May 2009, or auxiliary request 1 or 2 filed with the statement setting out the grounds of appeal dated 30 October 2006, or auxiliary request 3 filed by letter dated 15 May 2009. Additionally, reimbursement of the appeal fee was requested.

VIII. Claim 1 according to the *main request* reads:

"A method of analysis of a database, comprising:
identifying (100) a table in said database;
reading each of blocks associated with said table using direct asynchronous I/O; and
performing said analysis based on information contained in said blocks; characterised in that
reading includes:
creating plural block lists (110), each list identifying a set of blocks associated with said table;
spawning (110) plural threads; and

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performing the following for each respective thread,
assigning (115) one of said plural block lists to the
respective thread,
reading (120) each block identified by the assigned
block list using direct asynchronous I/O,
gathering (125) information for said analysis utilising
data contained in each block read, and
summing and averaging the information gathered by each
thread to perform said analysis".

IX. Claim 1 of *auxiliary request 1* is identical with that
of the main request except for its first part, which
reads:

"A method of analysis of a database, comprising:
identifying (100) a table in said database;
creating an extent list for the table to determine how
many blocks need to be processed;
creating plural block lists (110), each list
identifying a set of blocks associated with said table;
[etc.]".

X. Claim 1 of *auxiliary request 2* is identical with that
of auxiliary request 1 except that the third method
step reads:

"creating plural block sublists (110), each sublist
identifying a set of blocks associated with said table
and each created using an equal number of blocks or
proportionately as close to equal as possible".

XI. Claim 1 of *auxiliary request 3*, which is largely
identical with the second auxiliary request before the
examining division, reads:

"A computer-implemented method of determining a
condition of a database for reorganizing a table
thereof, wherein the database is formed of blocks and
has a percentage free threshold for row migration
within each block and a percentage used threshold to
permit additional rows to be inserted in each block,
the method comprising the steps of:
identifying a database table;
determining elements corresponding to the condition of
the database table based on data contained in the
database table; and
providing said elements to one of a display for viewing
by a user, a storage location, and a mechanism for
using said elements; characterized in that said
elements include number of blocks exceeding the
percentage used threshold and number of blocks less
than the percentage free threshold,
for rebuilding the table with adjusted values for the
percentage free threshold and/or percentage used
threshold".

XII.   At the end of the oral proceedings the Board announced
       its decision.

Reasons for the Decision

Main request

1.   *Interpretation of claim 1*

       The appellant has pointed out that the last method step
       of claim 1 is not performed for each thread, but takes

place once all threads have finished processing (cf
fig. 4). The Board will interpret the claim accordingly.

2.   *The prior art*

2.1   D1, entitled "Table reorganization identification",
        concerns a program tool to be used with a database
        management system (DBMS) for identifying tables that
        have undergone extensive changes and therefore need to
        be reorganised. The program collects statistical data
        about a table to be analysed and calculates various
        indicators of its level of disorganisation. D1 notes
        that the time needed for the analysis will depend on
        the table size (p. 165, top).

2.2   D2 describes a method of reorganising tables (rather
        than analysing them). Its starting point is the DBMS
        DATABASE 2 (DB2). A tool called DB2 REORG is
        conventionally used to reorganise a table. This tool
        contains the routine UNLOAD which reads all the data
        from a file to be reorganised (see section 1.10 in
        col. 5). The tool is said to be inefficient (see
        section 2.3 in col. 7) and D2 proposes improvements,
        some of which will be discussed in detail further below
        (see points 4.2 and 4.4).

3.   *The technical problem and its solution*

3.1   D1 discloses a method of analysis of a database. A
        table in the database is identified and its blocks are
        read out. Nothing is said about how the reading is
        performed. The skilled person was thus faced with the
        problem of finding a way of reading out the blocks.

In the Board's view it was clearly desirable that the reading should be fast since the analysis prevents normal use of the table. The appellant, however, has argued that D1 teaches away from considerations about the read-out speed since it explicitly mentions the table size, leading the skilled person to limit the size of tables. The Board is nevertheless of the opinion that it was a mere matter of common sense to realise that the time a task takes does not only depend on its size but also on the speed with which it is performed. Furthermore, the skilled person could be expected to pay particular attention to the I/O operations, which are known to be relatively slow.

3.2   The technical problem of finding a fast method of reading out data blocks is according to the invention solved by two different means, claimed in combination: "threading" and "direct asynchronous I/O". Whereas threading is a well-known technique, involving parallel processing, "direct asynchronous I/O" has not been shown to have a generally accepted meaning. It is defined in the description (p. 23, bottom) in the following way: "By using direct asynchronous I/O to read database files, Fast Analysis /ie the invention/ is able to directly access specific blocks of a file, thereby bypassing the overhead of typical DBMS routines (SQL shared memory techniques, and other parameters required to access the database tables, for example)". It can thus not be equated with conventional asynchronous (interrupt-driven) I/O, but additionally implies circumventing DBMS overhead.

4.   *Obviousness*

4.1   Searching for a solution to the above read-out problem,
        the skilled person would in the Board's view find D2
        which concerns the reorganisation of data tables. It is
        true that the appellant denies that he would have since
        D2 does not deal with table *analysis* and thus in the
        appellant's opinion belongs to a different technical
        area. The Board, however, noting that both D1 and D2
        mention table reorganisation and that an analysis of a
        table would be pointless unless a reorganisation was
        contemplated, cannot accept this argument. Table
        analysis and reorganisation are closely related
        techniques, and one important feature they have in
        common is the reading of table data.

4.2   Already the abstract of D2 mentions that the
        reorganisation method proposed "explores parallel
        processing and asynchronous I/O to a great extent". In
        section 1.5 (col. 3) various multi-tasking and multi-
        processor techniques are mentioned, and it is pointed
        out that "programs running in multitasking and/or
        multiprocessor environments may be designed to
        communicate with each other. This enables processes
        that are not independent of each other to execute in
        parallel". The Board understands this passage as
        referring to multiple threads. The appellant disagrees,
        pointing out that the reference is not to "threads" but
        to "programs". However, even if the word "thread" is
        not expressly mentioned the Board believes that the
        skilled person could not help thinking of threads in
        the given context. It is generally known that threads
        are parallel processes particularly distinguished by
        their use of a single process address space, ie by

their interdependence. In referring to mutually
dependent parallel processes, D2 therefore in the
Board's view led the skilled person to the idea of
reading blocks using a threading technique.

4.3   The second key feature in claim 1 is the "direct
asynchronous I/O". As already noted, this expression
must be regarded as implying that the overhead of (some)
DBMS routines is bypassed. This means operating outside
the conventional DBMS. A crucial question is thus
whether the skilled person would at all have considered
such a step.

4.4   In the Board's view this question can be readily
answered with "yes" since it is exactly what D2
recommends. D2 starts out from conventional DB2. The
known read-out routine UNLOAD does not use parallelism
(col. 5, l. 64,65) and therefore the DB2 components do
not "perform at an optimum level. Partitions could
actually be loaded in parallel" (col. 6, l.21-25). The
invention in D2 employs "concurrent unloading of
partitions" (col. 6, l. 53,54), involving "asynchronous
I/O" (col. 7, l. 37). "The method provides for its own
I/O, independent of DB2, thereby enhancing the I/O
algorithm" (col. 7, l. 51,52). These quotations
demonstrate that the skilled person was well aware of
the limitations of conventional DBMSs and would
recognise the advantages of developing alternative
functions. For the sake of completeness it might be
added that it is not an indication of non-obviousness
that such a development might be both complex and
expensive: merely making the proposal is neither.

4.5   The appellant has argued that the skilled person would
        not have realised that a conventional DBMS analysis
        command incurs overhead. This was the inventor's own
        non-obvious discovery.

        The application gives some examples of such overhead,
        such as "SQL shared memory techniques" (cf the
        quotation at point 3.2 above). At the oral proceedings
        before the Board the appellant, referring to E1
        (p. 1-15), explained that shared memory was usually
        regarded as necessary for optimal performance. In
        particular it was used for the cache. The Board, while
        accepting that shared memory may well have excellent
        properties in many respects, remains unconvinced that
        the skilled person would cling to this concept even
        when it could offer no advantages. If it was desirable
        to read data fast he would design a system that did
        just that. This meant in particular eliminating, as far
        as possible, any factors that could be seen to slow
        down the process. What the application simply refers to
        as "overhead" would be recognized as such by a skilled
        person who was well familiar with the prior art within
        his technical area. Whether or not he was prepared to
        eliminate a specific instance of overhead would depend
        on whether he actually needed the advantages it offered.
        With respect to the shared memory, for example, E1
        mentions that it serves to "minimize disk I/O" (p. 1-
        15), something which is hardly of interest if the very
        aim is to perform I/O commands. Moreover, the
        application is wholly silent on the measures to be
        taken in order to bypass the overhead. The bypassing
        step must thus be assumed to have been straightforward,
        suggesting that the overhead was manifestly irrelevant
        for the I/O operation.

4.6   Finally, the appellant has argued that the last feature
       of claim 1 - "summing and averaging the information
       gathered by each thread to perform said analysis" - was
       a non-obvious selection since other alternatives could
       be envisaged, such as performing the arithmetics
       together with the I/O operations in each thread. But
       also this argument cannot be accepted by the Board. The
       I/O operations would obviously be performed thread-wise
       since this is where considerable time saving could be
       expected. But the same is not necessarily true for the
       arithmetic operations. Whether or not they would be
       suitable for parallel processing would depend on their
       nature. Since the skilled man was familiar with both
       elementary mathematics and threading, he would have
       been able to decide at what point to perform the
       summing and averaging of data mentioned in the claim.
       Simply trying out the limited number of options would
       also have been straightforward. That the claimed
       alternative should be surprisingly efficient has not
       been disclosed or argued, nor does it appear likely.

4.7   It follows that the subject-matter of claim 1 does not
       involve an inventive step (Article 56 EPC 1973).

Auxiliary request 1

5.   According to auxiliary request 1 an extent list is
       created. This extent list "need only identify the
       location(s) of all space allocated for the identified
       table" (p. 25, l. 8-10). Since a table obviously cannot
       be read and analysed unless its location in the memory
       is known, this request must also be refused (Article 56
       EPC 1973).

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Auxiliary request 2

6.   According to auxiliary request 2 the set of blocks
      assigned to each thread consists of an (approximately)
      equal number of blocks. Noting that the purpose of the
      threads is to achieve concurrent processing, the Board
      regards it as a first choice to distribute the tasks
      evenly between the threads. D2 seems to adhere to the
      same principle since "an optimal number of partitions
      to be assigned to each task" is calculated (col. 10,
      l. 19-21), suggesting a single number of partitions per
      task. Thus, this request must also be refused
      (Article 56 EPC 1973).

Auxiliary request 3

7.   Auxiliary request 3 corresponds to auxiliary request 2
      before the examining division which was not admitted
      into the procedure under Rule 86(3) EPC 1973. The
      examining division was of the opinion that the subject
      matter defined therein returned to matter largely
      discussed and objected to much earlier in the written
      procedure and referred to its first communication of
      8 April 2004. In addition, in its immediate opinion the
      subject matter of claim 1 was not so as to support an
      assertion of an inventive step (decision under appeal,
      points 24.2 ff).

      In its first communication the examining division had
      raised objections under Rule 29(2) and Article 54(1)
      and (2) EPC 1973 stating that the application contained
      eight independent claims which did not fall within one
      or more of the exceptional situations set out in

paragraphs (a), (b) or (c) of Rule 29(2) EPC 1973 and moreover were all not novel. In reply the appellant filed amended claims thereby focusing on original claim 12 depending on original independent claim 10. After the examining division had taken a negative view on the preceding requests, the appellant filed the present auxiliary request which was mainly based on a version of original claim 1 limited to the number of blocks in relation to percentage used and percentage free thresholds, and which additionally contained the feature that these numbers were used for "rebuilding the table with adjusted values for the percentage free threshold and/or percentage use threshold". This covers another aspect of the invention which had never been examined by the examining division and which was not a subject of its first communication. It also does not seem that a proper inventive step assessment based on this additional feature was made, so that the reasons given by the examining division for not admitting this request were not correct.

Moreover, in the Board's view it seems legitimate to file such a request specifically since the elements "number of blocks exceeding the percentage used threshold" and "number of blocks less than the percentage free threshold" were subject of original claim 1. The reason why the appellant concentrated on the subject matter of original claim 12 in the first place was the objection under Rule 29(2) EPC 1973. It also does not seem that this request was filed too late since it was submitted one month prior to the oral proceedings, and was amended three days before the oral proceedings due to an Article 123(2) EPC objection raised by the examining division. The amendments made

during the oral proceedings were of a purely formal
nature. Thus, the examining division could have dealt
with this request in the oral proceedings without
delaying the procedure. Therefore, in this specific
situation, the examining division should have allowed
the request into the procedure.

Since, as set out above, auxiliary request 3 covers a
different aspect of the invention which has not yet
been examined by the examining division, the Board
remits the case to the department of first instance for
further prosecution (Article 111(1) EPC 1973).

Reimbursement of the appeal fee

8.   The appellant requested reimbursement of the appeal fee
        because in its view the examining division had not used
        its discretion in an appropriate manner when not
        admitting the second auxiliary request. As set out
        above, the reasons given by the examining division for
        not admitting this request were not correct. Thus it
        started from wrong assumptions when using its
        discretion which resulted in the wrong application of
        the law but does not qualify as a substantial
        procedural violation (Rule 67 EPC 1973).

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the department of first
        instance for further prosecution on the basis of
        claims 1-3 according to auxiliary request 3.

3.   The request for reimbursement of the appeal fee is
        refused.

The Registrar: The Chairman:

T. Buschek   S. Steinbrener