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**Datasheet for the decision
of 21 March 2017**

Case Number: T 2023/11 - 3.5.06

Application Number: 05774417.9

Publication Number: 1898304

IPC: G06F9/445

Language of the proceedings: EN

Title of invention:
COMPUTATIONAL EXPANSION SYSTEM

Applicant:
Imbert Management Consulting Solutions

Headword:
Computational expansion system/IMBERT

Relevant legal provisions:
EPC 1973 Art. 56, 84

Keyword:
Inventive step - main and first auxiliary requests (no)
Clarity - second auxiliary request (no)

Decisions cited:

Catchword:

D E C I S I O N
of Technical Board of Appeal 3.5.06
of 21 March 2017

Appellant:

(Applicant)

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Representative:

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Decision under appeal:

Decision of the Examining Division of the European Patent Office posted on 8 June 2011 refusing European patent application No. 05774417.9 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman	W. Sekretaruk
Members:	M. Müller
	G. Zucka

Summary of Facts and Submissions

I.   The appeal lies against the decision of the examining
        division, with reasons dispatched on 8 June 2011, to
        refuse the application for lack of inventive step over
        the document

        D1: US 6 542 920 B1.

II.   A notice of appeal was filed on 8 August 2011, the
        appeal fee being paid on the same day. A statement of
        grounds of appeal was received on 9 August 2011. The
        appellant requested that the decision be set aside and
        that the case be remitted to the department of first
        instance for further prosecution on the basis of
        claims 1-11 or 1-9 according to, respectively, a main
        or auxiliary request as filed with the grounds of
        appeal. The appellant appeared to be implicitly
        requesting that a patent be granted based on one of
        these two sets of claims. The other documents on file
        are as follows:

        description pages
        1, 3-7, 9 filed on 27 November 2009
        2, 2a, 8   filed on 21 October 2009
        drawings, sheets
        1/6-6/6   filed on 21 January 2008

III.   In an annex to a summons to oral proceedings, the board
        informed the appellant *inter alia* of its preliminary
        opinion that claim 1 of both requests lacked novelty or
        inventive step over D1, Articles 54 and 56 EPC 1973.

IV.   Oral proceedings were held on 21 March 2017. During the
        oral proceedings the appellant filed an amended set of
        claims 1-12 to replace the main request, and an amended

set of claims 1-10 as a new second auxiliary request.
In the new main request, only claims 1-6 were amended,
corresponding amendments of the other claims 7-12 being
postponed until after agreement was reached on claim 1.
The appellant further requested, in case the board was
not minded to grant a patent on the basis of any of the
pending requests, that it remit the case to the
examining division for further prosecution.

V.   Claim 1 of the main request reads as follows:

"A computation expansion unit (11) for expanding the
processing capacity of one or several central
processors (12) connected through a communications
system to the computation expansion unit (11) by
delegating partial of total execution of any of the
processes to be executed by the central processor (12);
characterized in that the computational expansion unit
(11) comprises a task manager (32) connected to an
internal management unit (53) which is adapted to
select a process manager (33) from a plurality of
different process managers (33), and a share [sic]
storage management unit (31) configured to share the
data received from the host (12) simultaneously with
the computational expansion unit (11), and the process
managers (33) are configured to retrieve the data,
execute the delegated process and make the result of
the delegated process available to the host (12) in the
same manner as if it had been calculated by the host
(12) itself."

Claim 1 of the first auxiliary request reads as
follows:

"A system for expanding the capacity of executing
processes which are executable in a central processor

(12) connectable to a computational expansion unit (11)
through a communications system; characterized in that
the computational expansion unit (11) comprises a task
manager (32) which is adapted to select a process
manager (33) in response to the reception in an
internal manager (53) of a requesting message of
executing of a predetermined process from the central
processor (12); being the process manager (33) selected
based on a pre-determined cost value of executing of
the predetermined process received in the internal
manager (53); and the internal manager (53) is adapted
to carry out a comparison among a plurality of cost
value [sic] received from the process manager (33) and
a predetermined cost value received from the central
processor (12)."

Claim 1 of the second auxiliary request reads as
follows:

"A computational expansion system (11) for expanding
the process capacity of one or several central
processors (12) connected to one or several central
processors (12); wherein the computational expansion
system (11) comprises a task manager (32) connected to
an internal management unit (53) which is adapted to
select a process manager (33) from a plurality of
different process managers (33) in response of [sic] a
request from the central processor (12), characterised
in that the internal manager (5) assigns the process to
the means (33, 12) having a lower cost value calculated
on the basis of the operative capacity not compromised
of the process manager (33) so that the process
capacity of the computational expansion system (11) is
dynamically assigned according to the required demand,
and in that the means (33, 12) are implemented as a
variety of computer environments comprising

programmable computers including a processor, computer-readable storage means that include volatile and non-volatile memory elements and/or storage elements, thereby creating a platform compatible with the host (12), not through a simulation / emulation of the host environment, that is more economical than the host (12), by using programs that do the same thing as in the host but running natively on an open system platform."

During the oral proceedings, the appellant noted that in the second occurrence of "the means" the reference sign 12 was incorrect and requested its deletion.

The main and both auxiliary requests also comprise independent claims for a method (7, 5 and 6, respectively) and a computer program (11, 8 and 10, respectively), and the main and the first auxiliary request further comprise an independent claim for a storage management means (12 and 9, respectively).

VI.   At the end of the oral proceedings, the chairman announced the decision of the board.

Reasons for the Decision

The invention

1.   The application addresses the problem that the
        processing capacity of a central computer (or host) may
        be too small to meet demand, for instance at peak
        times, and is thus concerned with "expanding" the
        processing capacity of the host by providing
        additional, external processors to which the host can
        delegate processes. Expansion is meant to be possible
        with essentially any "existing computer" available,
        irrespective of its platform, preferably though with
        computers which are "more economical" than the host
        (see page 2, line 33, to page 3, line 2; all references
        refer to the English translation of the application as
        filed on 27 November 2007 with the request for entry
        into the regional phase before the EPO). The overall
        system should carry out the processes without any need
        to adapt them (page 2, lines 10-13 and 21-26).

1.1   To solve this problem, the application proposes what is
        called a "computational expansion system" or "means" to
        be connected to the host (see page 3, lines 24-28, and
        figures 1 and 2).

1.2   The expansion system is disclosed as comprising several
        components (see, *inter alia*, figures 3 and 5), namely

        (a) a task manager,
        (b) an internal manager,
        (c) several process managers, and
        (d) a shared storage manager.

1.3   The host may request that a selected process be
        executed by the computational expansion system (see
        e.g. page 4, lines 6-8). The task manager, by means
        referred to as the internal manager, will receive the
        request, "negotiate" or "arbitrate" the execution of
        this process with the process managers (see page 4,
        lines 9-20, and page 7, lines 5-16) and eventually
        delegate the process to a process manager "that is
        capable of executing the delegated process with a lower
        cost than if it was executed by the host" (page 4,
        lines 30-34 *et seq.*; page 7, lines 17-21).

1.4   The decision may be made on the basis of a comparison
        of a "pre-determined cost value" associated with the
        process with a "cost parameter" described as a
        "function of specific physical parameters" of the
        process manager, including its processing power and
        memory capacity (page 4, line 35, to page 5, lines 6)
        available (also referred to as "not compromised") when
        the request was made (page 5, lines 10-21). If no
        process manager can execute the process at a lower cost
        than the host, it may be decided that the host keep it,
        and it is suggested that one process may "be executed
        simultaneously" in "two means 33, 12", the numbers 33
        and 12 referring to the process managers and the host,
        respectively (page 4, lines 30-34, and page 5,
        lines 22-25).

1.5   Data is exchanged between the host and the expansion
        system via shared storage provided by a "shared storage
        manager" (page 6, lines 1-5; page 7, lines 22-26). More
        specifically, this storage is meant to hold the "data
        from the host" and the "data obtained by the execution
        of the [delegated] process" (see page 6, lines 6-13).

Claim construction and clarity, Article 84 EPC 1973

2.   Claim 1 of all requests contains language and
        terminology which must be construed carefully. In the
        board's view, claim 1 of the main and the first
        auxiliary request is sufficiently clear to allow an
        assessment of inventive step, whereas the clarity
        problems in claim 1 of the second auxiliary request
        make an inventive-step assessment unreasonable.

3.   Claim 1 of <u>all requests</u> refers to capacity expansion,
        albeit in different words each time. Claim 1 of the
        main request refers to a "*unit* for expanding the
        processing capacity of one or several central
        processors", claim 1 of the first auxiliary request
        uses the phrase "for expanding the capacity of
        executing processes which are executable in a central
        processor", and claim 1 of the second auxiliary request
        refers to a "*system* for expanding the *process* capacity
        of one or several central processors" (all emphasis by
        the board). The board accepts that the "capacity" of
        the central processor(s) is, in an immediate sense,
        "expanded" by the provision of the "process managers",
        but notes that no means is claimed to support the *acts*
        of providing the process managers and of connecting
        them to the central processor(s). In the board's view
        this means that the claims do not relate to *expanding* a
        given central processor, but to the allocation of work
        in a distributed system with *expanded* capacity.

4.   Claim 1 of the <u>main request</u> refers to a "computational
        expansion unit", although the application only refers
        to a "computational expansion means" or "system". In
        the board's view, which was confirmed by the appellant
        during the oral proceedings, the application leaves
        open whether the expansion system is carried out in

hardware and software or merely in software. The term
"unit", to the extent that it implies a dedicated
hardware component while "means" and "system" do not,
would appear to go beyond the application as originally
filed. The appellant having declared, during oral pro-
ceedings, its willingness to replace "unit" by "means"
or "system", this question can however be left open.

5.   Claim 1 of the <u>main request</u> specifies that the shared
      storage management unit is "configured to share the
      data received from the host (12) simultaneously with
      the computational expansion unit". The board first
      notes that "the data" has no proper antecedent in the
      claim, so the term must be construed as "data". The
      board further takes the view that the skilled person
      would consider data to be "shared" if the host and the
      expansion unit can both access it when necessary. It is
      unclear what the term "simultaneous" adds to this
      notion. It is imaginable that the host and the
      expansion unit access the shared storage in parallel,
      e.g. the host writing data for one process while data
      for another process is being read by the expansion
      unit, but this is not disclosed in the application as
      filed (see page 6, lines 1-5). The appellant's
      suggestion that simultaneous sharing be construed as
      implying parallel storage access by the different
      process managers did not convince the board, because
      this interpretation is not disclosed in the application
      either, the application (like the claim) rather talking
      about sharing between the host and the expansion
      system. For the purposes of assessing inventive step,
      the board considers that the term "simultaneous" cannot
      be given a clear interpretation and hence must be
      ignored.

6.   Claim 1 of the <u>main request</u> specifies that the process
        managers should "make the result of the delegated
        process available to the host (12) in the same manner
        as if it had been calculated by the host (12) itself".
        The appellant suggested in oral proceedings that this
        phrase implied that the process managers had to provide
        the result in the same format as that used by the host.
        The appellant could not, however, establish that the
        application disclosed this interpretation (see esp.
        page 2, lines 10-13). The board takes the position that
        it is implicit that a delegated process must produce
        the same result "as if" it had not been delegated.
        Moreover, any result produced by a delegated process
        must be - or must be made - indistinguishable from the
        result produced by the host itself; otherwise, the
        purpose of the delegation would not be achieved. As a
        consequence, the board considers the cited phrase to be
        redundant over the reference to "delegation".
        Substantially the same objection and conclusion apply
        to the reference in claim 1 of the <u>second auxiliary
        request</u> to "programs that do the same thing as in the
        host".

7.   Claim 1 of <u>all requests</u> refers to a "task manager" and
        an "internal manager" or "internal management unit".
        The board takes it that the internal manager is the
        component of the task manager responsible for the
        process distribution and observes that other functions
        or components which the task manager might have are
        immaterial for the claimed subject-matter. Accordingly,
        the board concludes that no distinction between the two
        need be made when assessing the inventive merit of the
        claims at hand. The board notes in passing that this
        appears to correspond to the position which was taken
        by the examining division - and not challenged by the
        appellant - namely to identify both the task manager

and the internal manager with the RPM of D1 (see the decision, reasons 10.1).

8.   Claim 1 of the <u>second auxiliary request</u> specifies that

    (a) a process manager is selected "from a plurality of different process managers",

    (b) the process is assigned to "the means (33, 12) having a lower cost value calculated on the operative capacity not compromised of the process manager",

    (c) "the means (33, 12) are implemented as a variety of computer environments comprising programmable computers including" various elements (reference number 12 not being considered, as requested by the appellant during oral proceedings; see penultimate paragraph of point V above), and

    (d) the invention "creat[es] a platform compatible with the host (12), not through a simulation / emulation of the host environment, that is more economical than the host (12), by using programs that do the same thing as in the host but running natively on an open system platform".

8.1   With respect to (b) it is first noted that the "operative capacity not comprised of the process manager" is interpreted as the "operative capacity available in the process manager" (see page 5, lines lines 15-17).

8.2   With further regard to (b) (and (c)) it is observed that "the means" are undefined in the claim. It is further noted that reference signs (here 33 and 12) are not to be construed as limiting the claim (Rule 43(7) EPC).

8.2.1   The description discloses that the process is assigned
        to "the means 33, 12 having sent a lower cost
        value" (page 5, lines 22-25). The board accepts that
        the numbers 33 and 12 in this context must be
        interpreted to mean the "process manager 33" and the
        "host 12", respectively. In the description, it would
        seem that the comma "33, 12" can be construed as both
        "and" or "or", as the process can be assigned to the
        host or a process manager, depending on which sent "a"
        lower cost value, or to "two means 33, 12 in
        parallel" (*loc. cit.*). It is not clear, however,
        whether the *claimed* "means (33, 12)" must be construed
        as singular or plural and whether it requires, allows
        or excludes assignment to process manager and host in
        parallel.

8.2.2   If phrase (b) is interpreted to mean that the process
        may be assigned to the process manager or to the host,
        it is unclear why the claim only specifies the cost
        value calculated for the process manager and no cost
        value associated with the host.

8.3   With regard to (a) it is further noted that the
        relation between "selection" and "assignment" is
        unclear. "The process manager" cited in line 9 of
        claim 1 seems to refer to "a process manager" selected
        earlier (see claim 1, lines 5-6). Literally, this would
        suggest that the "assignment" is an operation following
        "selection". While, however, it may appear more
        reasonable to assume that assignment is to take place
        subsequent to a selection based on the cost values, the
        claim language puts this interpretation in doubt,
        because selection is stated to be of "a process manager
        (33) from a plurality of process managers" whereas
        assignment to "the means (33, 12)" seems to allow for

the possibility that assignment can also be to "the host 12".

8.4   The language of phrase (c) is, according to the appellant, disclosed on page 8, lines 11 *et seq.* in combination with the paragraph bridging pages 2 and 3. The appellant stated in the oral proceedings that this passage implied a heterogenous system in which the process managers and the host all have different "computer environments". The board disagrees. The cited passage on page 8 refers to the implementation of "the present invention" as a whole and does not exclude the possibility that all process managers - and possibly even the host - have the same computer environment. In other words, the precise meaning of the phrase (c) is unclear and, to the extent that it implies a heterogeneous system, it goes beyond the disclosure of the application as originally filed, Article 123(2) EPC.

8.5   With regard to (d) the board first notes that the phrase is grammatically unclear, inter alia due to the location of the relative clause "that is more economical [...]". It is unclear from the language of phrase (d) whether the created "platform compatible with the host" is meant to refer to one or to all process managers. Arguably, the corresponding passage in the description (paragraph bridging pages 2 and 3) refers to the "platform" of each individual process manager. It is unclear how the claimed features make possible the "creation" of a "platform compatible with the host", as opposed to "using" one or more given process managers which provide this platform (see also point 2 above). Characterising a platform as "more economical than the host" is unclear, firstly because it is ambiguous whether "economical" refers to monetary

or computational cost and, secondly, because the
relative monetary cost of host and process managers
("platform") does not imply any technical feature of
either: the price of a computer may change over time
and the price of one and the same computer may be lower
if several are purchased at the same time. Finally, the
board considers that the phrase "running natively on an
open system platform" is unclear and not sufficiently
clarified by the preceding negative feature "not
through a simulation / emulation of the host
environment".

8.6   In summary, the board concludes that claim 1 of the
        second auxiliary request lacks clarity within the
        meaning of Article 84 EPC 1973.

The prior art

9.   D1 discloses a mechanism for extending the processing
        power of a system by providing multiple "thread pools"
        which are accessed via a "request processing mechanism"
        RPM (see figure 1, no. 110, and abstract). The RPM
        determines the requested service and a suitable "thread
        pool" from which a thread is assigned to the request
        (see column 5, lines 8-19).

9.1   D1 notes that different services may have different
        processing requirements. Some services may be
        "heavyweight", in requiring a thread with a large
        stack, others may be "lightweight", i.e. executable on
        a thread with a small stack (see column 2, lines 9-21,
        and column 3, lines 9-10).

9.2   The properties of the different thread pools are
        specified in a "thread pool configuration table" and

users may "specify certain thread pools for certain
services" (figure 1, no. 114, figures 2 and 3;
column 5, lines 61-65, and column 7, lines 41-42). The
configuration table is used when the thread pools are
allocated but also when selecting a thread pool for a
requested service (column 5, lines 8 to 18, column 5,
line 54, to column 6, line 6, *et seq.*, and column 8,
line 40 *et seq.*).

9.3   In making its decision, the RPM determines which thread
        pool is associated with the requested functionality or
        "type" of service (see column 9, lines 17-60). It is
        disclosed that such an association should exist for
        every request (see column 9, lines 55-57).

Main request

10.   Claim 1 of the main request boils down to specifying a
        "computational expansion unit" (system) which connects
        a host and several "process managers", provides a "task
        manager" for selecting a process manager to execute a
        process, and provides a "shared storage manager" for
        the communication between the host and the process
        managers.

10.1   The claimed "processes" can be considered to be the
        "threads" of D1 and the claimed "task manager"/"inter-
        nal management unit" is considered to be the RPM of D1.
        It is clear that in D1 the individual threads read from
        and write to regions of the web server's memory. Thus
        the claimed shared storage management unit is implicit
        in D1.

10.2   The board considers that any line in the configuration
        table of D1 may be taken to "expand" the processing
        capacity of the web server's processor in that it

enables the web server to process a certain type of service request. The appellant favoured a narrower interpretation to the effect that the web server's processor has some, fixed capacity which does not change when a new thread pool is allocated. The board has doubts that the term "capacity" requires this narrow interpretation.

10.3   However, even if it did, this would, in the board's view, only mean that the claimed system provided more than one processor for the delegation of processes. This would constitute the only difference between claim 1 and D1, which does not disclose the web server to have more than one processor.

10.4   The board considers it obvious for the skilled person to increase the performance of the web server of D1 by equipping it with, say, a multiprocessor. This would increase the web server's capacity in the recited narrower sense and it would, in this situation, be natural for the skilled person to spread the thread pools over the different processors.

10.5   The board therefore concludes that claim 1 of the main request lacks inventive step over D1, Article 56 EPC 1973.

First auxiliary request

11.   Claim 1 of the first auxiliary request does not specify a shared storage manager but states that the process manager is selected on the basis of "a comparison among a plurality of cost value[s] received from the process manager [...] and a predetermined cost value received from the central processor".

11.1   D1 discloses that a "cost value" such as the required
        stack size of a thread is taken into account, if
        indirectly, when selecting which thread pool is to
        serve a given request (see e.g. figure 2).

11.2   D1 does not, however, disclose a comparison between a
        cost value (of the requested service) and a cost
        parameter (of the thread pools in question) in making
        that decision.

11.3   From the perspective of D1, this difference can be said
        to solve the problem of assigning to a thread pool a
        service request of a type of which, exceptionally, is
        not listed in the association table (see figure 3 and
        column 9, lines 55-57). If the requested service
        happened to require a large stack it would seem obvious
        to assign it to a thread pool associated with other
        heavyweight service types. This would require a direct
        comparison between the required "cost value" and the
        "cost parameters" of the available thread pools.

12.   Accordingly, the board concludes that also claim 1 of
        the first auxiliary request lacks inventive step,
        Article 56 EPC 1973.

Second auxiliary request

13.   During the oral proceedings, the appellant explained
        and stressed that the invention was concerned with the
        expansion of a host computer by exploiting the
        computing power of *external* computer devices connected
        over a network, whereas D1 was confined to organising
        work *within* a single computer (the web server). The
        board understands that the second auxiliary request was
        an attempt to express this fact in the claims so as to

set claim 1 further apart from D1, but also that this
was difficult in view of Article 123(2) EPC and a
description which is short and itself unclear in many
ways. As explained above, claim 1 of the second
auxiliary request lacks clarity (Article 84 EPC 1973)
to suc2h an extent that the board found it impossible
to provide a separate assessment of its inventive
merit. It is stressed that this must leave open whether
a claim that expressed the appellant's intention as
recited would have been non-obvious over D1, and how
the proceedings would have continued after such a
finding.

Request for remittal

14.   Already with its statement of grounds of appeal, the
       appellant requested remittal of the case to the
       department of first instance on the basis of the
       amended claims. As no fundamental deficiency in the
       first-instance proceedings was apparent, the board
       decided not to remit the case under Article 11 RPBA
       without considering its merits.

15.   At the end of the oral proceedings, the appellant
       stated that remittal was the appropriate course of
       action because in examination it had been given too few
       opportunities to amend its claims. The board disagrees.
       Firstly, it would not serve any purpose to remit a case
       for further prosecution on the basis of requests which
       the board itself has already determined not to be
       allowable. Secondly, the appellant filed amended claims
       on entry into the regional phase before the EPO and in
       response to a communication from the examining
       division. The appellant chose not to request oral
       proceedings and the examining division was not obliged

to give the applicant another opportunity to amend the application. And thirdly, the board notes that the appellant had several opportunities to amend the application in the appeal proceedings: with the grounds of appeal, in response to the board's preliminary opinion (to which the appellant chose not to respond in writing) and during the oral proceedings before the board. The board therefore does not accept that a remittal to the examining division is required, to give the appellant yet further opportunities for amendment.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

B. Atienza Vivancos   W. Sekretaruk

Decision electronically authenticated