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**Datasheet for the decision  
of 21 February 2019**

**Case Number:** T 0068/15 - 3.5.05

**Application Number:** 10737104.9

**Publication Number:** 2425324

**IPC:** G06F3/06

**Language of the proceedings:** EN

**Title of invention:**

Device and method for storage, retrieval, relocation, insertion  
or removal of data in storage units

**Applicant:**

Gandhi, Kamlesh

**Headword:**

Managing data in storage units/Gandhi, Kamlesh

**Relevant legal provisions:**

EPC Art. 52(1), 84, 123(2)  
RPBA Art. 13(1)

**Keyword:**

Novelty - main and first auxiliary request (no)  
Late-filed auxiliary requests - admitted (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 0068/15 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 21 February 2019**

**Appellant:** Gandhi, Kamlesh  
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**Representative:** Vidon Brevets & Stratégie  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 12 August 2014  
refusing European patent application No.  
10737104.9 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** N. H. Uhlmann  
D. Prietzel-Funk

## **Summary of Facts and Submissions**

- I. The appeal is against the examining division's decision to refuse European patent application No. 10737104.9.
- II. During the proceedings, the examining division introduced the following documents:  
  
D1 WO 2008/082996;  
D2 US 2007/300009;  
D3 WO 2007/019174.
- III. The examining division decided that independent claims 1 and 11 of the sole request extended beyond the content of the original application documents and that the subject-matter of claims 1 and 11 lacked novelty in view of document D3. Moreover, the decision stated that the subject-matter of the dependent claims did not meet the novelty and/or inventive step requirements of the EPC.
- IV. With the statement setting out the grounds of appeal, the appellant requested that the decision be set aside and a patent be granted based on the claims of a main request or auxiliary request, both submitted with this statement.
- V. The board arranged to hold oral proceedings.
- VI. With the summons, the board set out its provisional view of the case. The board considered, with regard to both requests, that the requirements of Articles 54 and 84 EPC were not met. Further, the claims of the main request were said to comprise added subject-matter, contrary to the provisions of Article 123(2) EPC.

- VII. In response, the appellant filed second, third, fourth and fifth auxiliary requests and submitted further arguments regarding these requests.
- VIII. In a second response, dated 8 February 2019, the appellant submitted a sixth auxiliary request, accompanied by arguments.
- IX. Oral proceedings were held on 21 February 2019 and were attended by the appellant, which submitted seventh and eighth auxiliary requests.
- X. The final requests of the appellant were that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request or, in the alternative, of one of the first to eighth auxiliary requests.
- XI. Claim 1 of the main request reads as follows:
- "A device for inserting one or more data elements at a predetermined address in a series of data elements stored in a storage unit(500), characterized in that it comprises:
- a. a storage unit(500), the storage unit including:
    - i. an address space, comprising one or more ranges of addresses; and
    - ii. a plurality of storage blocks, each storage block comprising a number of addresses for storing data elements, wherein one or more addresses in a storage block are associated with one or more addresses in the said address space; and
    - iii. an data mapping module (102), the data mapping module including a number of data mapping entries, each data mapping entry

maintaining an association of a range of storage addresses with logical addresses;

and

b. an address re-mapping module(108), configured to dissociate one or more addresses in a storage block in a storage unit from one or more addresses in the address space in the said storage unit, and re-associate the said dissociated addresses in the said storage block with one or more other addresses in the said address space;

the device being characterized in that the said storage unit is configured to at least one of:

- i. insert data in the storage unit by increasing the effective size of a storage block;
- ii. insert data in the storage unit by replacing a storage block with another storage block having a larger effective size; and
- iii. maintain one or more data mapping entries in a logical sequence, and relocate the data elements in a storage block to new addresses in the address space by modifying the position of a data mapping entry in the logical sequence."

XII. Claim 1 of the first auxiliary request reads as follows:

"A device for storage, retrieval, relocation, insertion, or removal of data, comprising:

- a. one or more storage units, comprising:
  - i. an address space, comprising one or more ranges of addresses; and
  - ii. a plurality of storage blocks, each storage block comprising a number of addresses for storing data elements, wherein one or more addresses in a storage

block are associated with one or more addresses in the said address space; and

b. an address re-mapping module, configured to dissociate one or more addresses in a storage block in a storage unit from one or more addresses in the address space in the said storage unit, and re-associate the said dissociated addresses in the said storage block with one or more other addresses in the said address space;

the device being characterized in that the said storage unit is configured to :

i. maintain a collection of data mapping entries for associating the addresses in the storage block with the addresses present in the address space, each data mapping entry maintaining values to identify a storage block, and the effective size of the storage block, and a base address associated with the storage block;

ii. increase or decrease the value indicating the effective size of a storage block; or

iii. modify the base address of a storage block;

iv. insert one or more additional data elements at and subsequent to a predetermined address in an address space within an existing series of data elements stored in a storage unit."

XIII. Claim 1 of the second auxiliary request differs from claim 1 of the main request in that

- integers a.i and a.ii refer to "logical addresses" in the address space;
- the device is configured to at least one of the features of the integers i. and ii. in the characterising portion;
- the device is further configured to the feature of integer iii.; and

- "a data mapping entry" in the integer iii. is replaced by "the storage block."

XIV. Claim 1 of the third auxiliary request differs from claim 1 of the first auxiliary request in that instead of the storage unit, the device is configured according to the features of integers i. - iv.

XV. Claim 1 of the fourth auxiliary request reads as follows:

"A method for inserting one or more additional data elements at a predetermined logical address in a series of data-elements stored at a number of logical addresses in a storage unit, the storage unit configured to simultaneously insert or remove two or more data elements, comprising:

- a. configuring the storage unit with
  - i. a storage medium;
  - ii. a logical address space, the logical address space having a number of logical addresses;
  - iii. a plurality of ranges of storage addresses, for storing data elements, each range of storage addresses being a number of addresses on a storage medium, and each range of storage addresses being mapped to a range of contiguous logical addresses; and
  - iv. a plurality of data mapping entries for mapping the ranges of storage addresses with the ranges of logical addresses;

wherein

- a. a number of data elements, at or beyond the predetermined logical address, are relocated from



their logical addresses to new logical addresses by dissociating one or more ranges of storage addresses from their logical addresses and mapping said one or more ranges of storage addresses with new logical addresses;

and

b. at least one range of storage addresses is mapped to a new range of logical addresses without storing a logical address in a data mapping entry."

XVI. Claim 1 of the fifth auxiliary request differs from claim 1 of the fourth auxiliary request in that the integer b. is replaced by:

"b. the logical address to which a range of storage addresses is mapped is determined based on:

- i. the size of one or more other ranges of storage addresses in the storage unit, or
- ii. the position of a data mapping entry in an ordered list of data mapping entries."

XVII. Claim 1 of the sixth auxiliary request reads as follows:

"A device for inserting one or more data elements at a predetermined address in a series of data elements stored in a storage unit (500), characterized in that it comprises:

a. a storage unit (500), the storage unit including:

- i. an address space, comprising one or more ranges of addresses; and

- ii. a plurality of storage blocks, each storage block comprising a number of addresses for storing data elements, wherein one or more addresses in a storage block are associated with one or more addresses in the said address space; and
- iii. a data mapping module (102), the data mapping module including a number of data mapping entries, each data mapping entry maintaining an association of a range of addresses in a storage block with addresses in the address space;

and

- b. an address re-mapping module (108), configured to dissociate one or more addresses in a storage block in the storage unit from one or more addresses in the address space in the said storage unit, and re-associate the said dissociated addresses in the said storage block with one or more other addresses in the said address space;

the device being characterized in that

- i. the device is configured to maintain the data mapping entries in a logical sequence, for mapping data elements in a storage block to addresses in the address space based on the cumulative effective sizes of one or more preceding storage blocks in the logical sequence, the effective size of a storage block being the number of data elements in the storage block that are mapped to addresses in the address space; and

ii. the device is configured to relocate one or more data elements stored in a storage block, from their address in the address space to a new address in the address space, by modifying the position of said storage block in the logical sequence."

XVIII. Claim 1 of the seventh auxiliary request differs from claim 1 of the fifth auxiliary request in that the integer b. is replaced by:

"b. the logical address to which a range of storage addresses is mapped is determined based on:

i. the size of one or more other ranges of storage addresses in the storage unit, and

ii. the position of a range of storage addresses in a logical sequence of ranges of storage addresses,

a given range of storage addresses in said logical sequence storing at least a location of another range of storage addresses that follows the given range of storage addresses in said logical sequence."

XIX. Claim 1 of the eighth auxiliary request differs from claim 1 of the sixth auxiliary request in that in the second line, the wording "characterized in that it comprises" is replaced by "comprising" and the wording "a given storage block in said logical sequence storing at least a location of another storage block that follows the given storage block in said logical sequence"

is added at the end of integer i. in the characterising portion.

### **Reasons for the Decision**

1. The appeal complies with the provisions referred to in Rule 101 EPC and is therefore admissible.
2. The invention

The application relates to storage systems and addresses the problem of modifying the content of a file, as seen by software applications, and thereby minimising modifications on the physical storage. For instance, if a number of bytes are to be inserted in the middle of a file, the bytes which follow the point of insertion should not have to be moved to new physical locations.

As a solution, the application describes data mapping entries, which maintain an association between ranges of logical addresses (the ones visible to software applications) and ranges of physical addresses. The physical storage is organised in a number of storage blocks.

The data mapping entries comprise (1) a value to identify a storage block, (2) the number of data elements in the storage block which belong to the file (called effective size), and (3) a base address of the storage block in the logical address space (page 9, third paragraph).

In a further embodiment, the data mapping entries form a linked list and comprise the components (1) and (2). The component (3) is calculated based on the cumulative effective size along the linked list (page 9, fourth paragraph).

3. Prior art

Document D1 discloses a storage system with flash memory, in which mapping between file data addresses and logical data block addresses takes place. Index entries are used for the mapping. They are stored as a sequence in a file index table (FIT). The handling of insert operation is described in detail. In particular, data is inserted without moving already stored data to new physical locations. Paragraphs 108 - 117 and figures 13 and 14 are of particular interest in this regard.

Main request

4. The board holds the view that the requirements of Article 123(2) EPC are not complied with.

The characterising portion of claims 1 and 9 requires that the "storage unit is configured to at least one of" three different steps.

Step i is only disclosed in the last paragraph on page 27. While increasing of the effective size is referred to on page 9, third and fourth paragraphs of the description, this passage does not relate to inserting of data in the storage unit.

Step ii is described on page 30, first full paragraph.

Steps i and ii are not only disclosed in separate embodiments of the description, but they only make sense as alternative techniques, in other words data is inserted either by increasing the effective size of a storage block or by replacing a storage block with another storage block having a larger effective size.

With regard to step iii, the fourth paragraph on page 9 discloses a related but different technique. While the

claim's language requires that the position of a data mapping entry in the logical sequence is modified, this passage of the description teaches that the position of the storage block in the logical sequence is modified. The third paragraph on page 27, last sentence, confirms that the logical sequence of storage blocks is updated.

Consequently, feature iii extends beyond the original content of the application and, moreover, features i, ii and iii are not disclosed in combination.

5. For the following reasons, the requirements of Article 84 EPC are not met.

Claim 1 refers to address space (integer a.i) and to logical addresses (integer a.iii). While it appears that the logical addresses belong to the address space, this is not made clear by the claim's language. Consequently, the requirements of Rule 49(11) EPC with regard to consistency of the terminology are not complied with.

The characterising portion of the independent claims requires that the storage unit is configured to carry out certain actions. Having in mind that the storage unit, as claimed and described, can be a memory region or a storage file, it is questionable how a storage file, for example, could insert data in itself.

Further, the independent claims refer to a device and a method respectively for inserting of data elements; however, the only two steps which comprise functions relating to insertion of data (steps i and ii) are optional.

6. In view of the explanation detailed below, the board considers that the subject-matter of the independent

claims lacks novelty, contrary to the requirements of Article 52(1) EPC.

6.1 Document D1 discloses a device for inserting data elements at a predetermined address in a storage unit (figure 13C, paragraph 113), wherein the storage unit comprises an address space (figure 13C, addresses F0 - F3) and storage blocks for storing data, the addresses within the storage blocks being associated with addresses in the address space (figure 13, paragraph 113, storage addresses Dn are associated, via data group index entries, with addresses Fn; the logical blocks in this document anticipate the storage blocks as claimed). The data group index entries anticipate the data mapping entries as claimed, while the file index table (FIT) corresponds to the data mapping module (paragraph 113). Moreover, in the course of the inserting of data (figure 13C), the association between storage addresses Dn and addresses in the address space Fn is modified (paragraph 113). This teaching anticipates the functionality of the address re-mapping module as claimed.

6.2 With regard to the characterising portion of the independent claims, document D1 discloses increasing the number of data elements in a storage block, which corresponds to increasing the effective size of the block 185, in the course of the "append" operation (figures 13A and 13B, paragraph 112). Further, paragraph 113 also teaches a relocation of data elements in a storage block in the course of an "insert" operation; the corresponding index entries are stored as an ordered sequence (paragraphs 109 and 113, data elements between the storage addresses D1 and D2 in figure 13C are relocated from the starting address F1 to the new starting address F2; the index entry for

the address D1 changes from second to third position in the sequence). While the appellant is correct in stating that in document D1 an address field in an index entry is updated, such an update is not excluded by the claim's language.

Finally, document D1 sets out in paragraph 114 an alternative method for inserting data in a file, in which the complete data of the file is written as a new file, followed by deleting the old file. In this case it is self-evident that the storage block 185 is replaced by another storage block, which, due to the insertion of data, comprises more data elements. Consequently, this document discloses step iii of the characterising portion of the independent claims.

#### First auxiliary request

7. Independent claims 1 and 11 do not comprise corresponding features, in contradiction to the explanations of the appellant in the statement setting out the grounds of appeal, section 1.h. Features b.i and b.ii are only present in claim 11.

The characterising portion of the independent claims requires that the storage unit is configured to carry out certain actions. Having in mind that the storage unit, as claimed and described, can be a memory region or a storage file, it is questionable how a storage file, for example, could insert data in itself.

For these reasons, the requirements of Article 84 EPC are not met.

8. The board considers that the subject-matter of the independent claims lacks novelty, contrary to the requirements of Article 52(1) EPC. The reasons therefor are detailed in the following.



- 8.1 Document D1 discloses features a and b from the pre-characterising portion as well as the increasing of the value indicating the effective size of a storage block and step iv, as set out above with regard to the main request.

Further with regard to feature i from the characterising portion, this document discloses data group index entries which anticipate the data mapping entries as claimed (paragraph 113). These entries comprise values to identify a storage block (D0 and D1 in paragraph 110 and on figure 13A), a base address associated with the storage block (F0 and F1 in paragraph 110 and on figure 13A), and the effective size of the storage block (the length of the data is stored in the data group index entries, last sentence of paragraph 110).

Feature iii is anticipated by the modification of the address Fn which is associated with a storage address Dn. For instance, in paragraphs 112, 113 and figures 13B, 13C, the storage address D1 is first associated with the address F1 and subsequently with the address F2.

- 8.2 Document D1 does not appear to disclose explicitly the decreasing of the value indicating the effective size of a storage block.

However, due to the "or" connection both between "increasing" and "decreasing the value" as well as between features ii and iii, the board considers that the subject-matter of independent claim 1 lacks novelty, contrary to the requirements of Article 52(1) EPC.

For the sake of completeness and in view of the explanations set out above with regard to the main

request, the board notes that document D1, in particular paragraph 113 and figure 13, discloses features b.i and b.ii of claim 11. Hence, the subject-matter of this claim is not new.

8.3 The arguments of the appellant are not persuasive.

In section 2.1 of the statement setting out the grounds of appeal, the appellant alleges that neither of documents D1 or D3 discloses features i and ii of the characterising portion. However, in the board's view, the appellant refers to aspects which do not form part of these features as claimed. Moreover, document D1 clearly discloses increasing of the size of a data group, in case of appending data (paragraph 112).

The explanations of differences between the claimed subject-matter and document D3 (section 2.2 of the statement) do not have any bearing on the reasoning based on lack of novelty with regard to the teaching of document D1.

While the appellant may be right regarding the modification of FIT entries (section 2.3 of the statement), the wording of the claim does not exclude such modifications.

Section 2.4 of the statement appears to assume that the data mapping entries do not comprise a base address. This contradicts the unambiguous wording of claim 1, line 17. Moreover, the present independent claims are based on the third paragraph on page 9, while the logical sequence of data mapping entries is described in the alternative embodiment in the fourth paragraph on page 9. Finally, the effects the appellant refers to appear to occur only in specific situations, while the claimed subject-matter is not so limited. For example, the number of the data mapping entries appears to

depend on the relationship between storage block size, the present occupation level of a storage block, and the amount of data to be inserted. Depending on the specific situation, the technique described in document D1 avoids the need for an additional index entry. For instance, in the case described in paragraph 112 and figure 13B, no additional index entry is to be created upon inserting data at the end of the file.

With regard to section 2.5, the board notes that the independent claims do not relate to virtual memory regions. In addition, the dependent claims refer to virtual memory in very general terms only.

#### Second and third auxiliary requests

9. The claims of these requests have been amended vis-à-vis the main request and the first auxiliary request, respectively, to address the objections under Articles 84 and 123(2) EPC.

The board concurs with the appellant that the present claims meet the requirements of those EPC provisions.

However, the objection pursuant to Article 52(1) EPC is still valid. In this regard, the appellant, both in writing and in the course of the oral proceedings, merely referred to its written submissions in the statement setting out the grounds of appeal.

The board does not see a reason to deviate from its preliminary opinion on novelty, hence the second and third auxiliary requests do not have a prospect of success and are not admitted into the proceedings, pursuant to Article 13(1) of the Rules of Procedure of the Boards of Appeal (RPBA).

Fourth and fifth auxiliary requests

10. The subject-matter of claim 1 of these requests extends beyond the content of the application as originally filed, contrary to the requirements of Article 123(2) EPC.

10.1 As a basis for the amended claims, the appellant explains that "claims ... comprise features that are disclosed in combination in the embodiment of figures 4A, 4B, 4C and 4D and also in the embodiment of figures 5A and 5B".

The board disagrees, for the reasons that follow.

10.2 Firstly, these figures and the text passages of the description (page 18, second full paragraph up to page 20, second paragraph), and indeed the entire specification, consistently refer to storage blocks. The present claims, in contradiction to the teaching of the application, do not.

10.3 Secondly, these passages do not disclose any data mapping entries (only referred to on page 9).

10.4 Thirdly, no basis is apparent for "simultaneously insert or remove two or more data elements".

10.5 Fourthly, no basis is apparent for "a range of contiguous logical addresses". The application merely refers to "contiguous data elements" in the different contexts of removing data elements (figures 14x, page 28 including four lines on page 29) and of "replacing a storage block in a storage unit" (figures 15x, pages 29 and 30).

10.6 The appellant explained at the oral proceedings, with regard to a range of storage addresses, that storage blocks are meant.

In the board's view, this argument is of no relevance for the objections set out in sections 10.2 - 10.5, *supra*.

11. With regard to Article 84 EPC, one of the clarity objections from the summons to oral proceedings (section 7.2, second objection) has not been overcome, in view of the following wording of claim 1:  
"the storage unit (is) configured to simultaneously insert or remove two or more data elements".
12. Consequently, the claims of these requests introduce new objections and do not remedy one of the objections raised in the summons to oral proceedings. For these reasons, the fourth and fifth auxiliary requests do not have a prospect of success and are not admitted into the proceedings, pursuant to Article 13(1) RPBA.

#### Sixth auxiliary request

13. The board opines that the combination of features as set out in claim 1 extends beyond the content of the original application documents (Article 123(2) EPC).
- 13.1 As a basis for the amended claims, the appellant explains that they are based on the claims of the second auxiliary request and further on the embodiments of figures 4A, 4B, 4C and 4D, figures 5A and 5B and page 9.
- 13.2 Claim 1 refers to "modifying the position of said storage block in the logical sequence" (last part of the integer ii. in the characterising portion). Storage blocks in a logical sequence are explained in detail in figures 4B and 4D and on pages 18 and 19 of the description. These passages make clear that the storage blocks comprise capacity, size and storage block location of the next block in the logical sequence. At

the same time, claim 1 refers to data mapping entries which form part of the storage unit, as the storage blocks do (integers a.ii and a.iii). According to the description (page 9), the data mapping entries comprise capacity and size information. Hence, claim 1 requires that data mapping entries and storage blocks are present in a storage unit, and that they comprise similar information, i.e. capacity and size.

However, the application as originally filed does not provide a basis for such duplication of information.

13.3 The appellant argued at the oral proceedings that the skilled person, based on the teaching of figures 4x, 5x and page 9, would duplicate the capacity and size information and be able to derive the subject-matter of claim 1.

13.4 The board is not persuaded by this argument. In particular, it goes against the basic principles of data processing to duplicate data without compelling technical reasons to do so. No such reasons were put forward by the appellant, nor is the board aware of any.

14. With regard to Article 84 EPC, one of the clarity objections from the summons to oral proceedings (section 7.2, last objection) has not been overcome because claim 1 does not comprise any features pertaining to inserting of data elements.

The appellant argued that integer ii. of the characterising portion should refer to inserting of data elements and not to "relocating of data elements".

The board does not agree because the complete wording of this integer makes abundantly clear that it deals with data elements which form part of the storage

block, already have a logical address and are merely relocated to another logical address.

15. Consequently, the claims of this request introduce new objections and do not remedy one of the objections already raised in the summons to oral proceedings. For these reasons, the sixth auxiliary request does not have a prospect of success and is not admitted into the proceedings, pursuant to Article 13(1) RPBA.

#### Seventh and eighth auxiliary requests

16. These requests were filed by the appellant in the course of the oral proceedings. It was explained that they were based on the fifth and sixth auxiliary requests, respectively, and had been amended specifically to overcome the novelty objection set out in the summons to oral proceedings.

No arguments were put forward regarding the objections pursuant to Articles 84 and 123(2) EPC for the fifth and sixth auxiliary requests (sections 10., 11., 13. and 14., *supra*).

17. The board holds that claim 1 of the seventh auxiliary request does not meet the requirements of Articles 84 and 123(2) EPC, for the reasons explained in sections 10.2 - 10.5 and 11., *supra*.

Further, the board finds that claim 1 of the eighth auxiliary request does not meet the requirements of Articles 84 and 123(2) EPC, for the reasons explained in sections 13.2 - 13.4 and 14., *supra*.

The board notes, moreover, that the clarity objections referred to in sections 11. and 14. have already been raised in the summons to oral proceedings.

18. Consequently, the claims of these requests introduce new objections and do not remedy one of the objections

raised in the summons to oral proceedings. For these reasons, the seventh and eighth auxiliary requests do not have a prospect of success and are not admitted into the proceedings, pursuant to Article 13(1) RPBA.

## Order

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

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated