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Datasheet for the decision of 27 September 2022

Case Number: T 2661/19 - 3.5.05

Application Number: 14873676.2

Publication Number: 3079067

IPC: G06F12/02, G06F11/34

Language of the proceedings: EN

Title of invention:
METHOD AND APPARATUS FOR USING SOLID STATE DISK

Applicant:
Huawei Technologies Co., Ltd.

Headword:
USING SOLID STATE DISK / Huawei

Relevant legal provisions:
EPC Art. 123(2)
RPBA 2020 Art. 13

Keyword:
Amendments - extension beyond the content of the application as filed (yes)

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Case Number: T 2661/19 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 27 September 2022

Appellant: (Applicant)	Huawei Technologies Co., Ltd. Huawei Administration Building Bantian Longgang District Shenzhen, Guangdong 518129 (CN)
Representative:	Gill Jennings & Every LLP The Broadgate Tower 20 Primrose Street London EC2A 2ES (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 20 March 2019 refusing European patent application No. 14873676.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	N. H. Uhlmann
	E. Mille

Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division to refuse the European patent application in suit.

II. The examining division decided that neither the subject-matter of the independent claims of the main request nor that of the first and second auxiliary requests involved an inventive step. Moreover, it decided that the second auxiliary request failed to meet the requirements of Article 84 EPC.

III. The examining division made reference to, *inter alia*, the following documents:

D1 US 2012/023365
D11 US 2011/191526

IV. With its statement setting out the grounds of appeal, the appellant submitted its arguments and maintained the requests underlying the contested decision.

V. The board summoned the appellant to oral proceedings.

In a communication under Article 15(1) RPBA 2020, the board set out its provisional opinion on the case.

VI. With a letter dated 25 February 2022, the appellant submitted an amended new main request and amended first and second auxiliary requests.

VII. On 24 March 2022, the appellant informed the board that it would not attend the oral proceedings.

VIII. The oral proceedings were cancelled and the appeal proceedings were continued in writing.

IX. The appellant's requests are that the decision under appeal be set aside and that a patent be granted based on the claims of the main request or, alternatively, on the claims of the first or second auxiliary request, all of which were filed with the letter dated 25 February 2022.

X. Claim 1 of the main request is worded as follows:

"A solid state disk using method, comprising:

when an operation needs to be performed on a data block in a solid state disk, determining (101) a latency of the data block to-be-operated according to a load balancing table of the solid state disk, wherein the latency is a time duration for performing the operation and is obtained in a process of performing the operation, and the load balancing table records a latency of each data block, which is updated according to the latency obtained in a process of performing the operation, and the operation comprises an erase operation or a write operation;

determining (102) whether the latency of the data block is greater than a warning value, wherein the warning value is less than a typical latency, and the typical latency is the smallest latency in the latencies of all the failed erase and write blocks in the solid state disk; and

prohibiting (103) performing the operation on the data block if the latency of the data block is greater than the warning value;

characterized in that multiple levels of threshold are set to values according to the warning value, each level of threshold is less than the warning value and the multiple levels of threshold are arranged in

ascending order, and a process for determining the data block to-be-operated comprises:

determining whether a latency of a data block selected randomly from the solid state disk reaches to a current level of threshold;

taking the selected data block as the data block to-be-operated when the latency of the selected data block does not reach the current level of threshold;

avoiding to perform the operation on the selected data block when the latency of the selected data block reaches the current level of threshold, and performing the operation on another data block so that all data blocks reach the current level of threshold;

when all the data blocks in the solid state disk reach to the current level of threshold, taking a level of threshold larger than and next to the current level of threshold as a new current level of threshold."

XI. Claim 1 of the first auxiliary request is based on claim 1 of the main request. The first part of the characterising portion reads as follows:

"characterized in that multiple levels of threshold are set to values to grade the blocks based on reliability according to the warning value".

XII. Claim 1 of the second auxiliary request is based on claim 1 of the first auxiliary request. The wording

"such that all the blocks reach the threshold at the same time"

has been added at the end of the claim.

Reasons for the Decision

1. The present application pertains to a method and apparatus for dealing with data blocks on a solid state disk. When an operation (e.g. writing data) is to be performed, a data block must be selected on which the operation will be carried out. A load-balancing table stores a latency (i.e. the time for performing an operation) for each data block. When the latency is greater than a warning value, the data block is not used. Additionally, a plurality of threshold levels is defined, all of which are smaller than the warning value. The latency of a data block is compared with a threshold level. If the latency is smaller, the data block is selected; otherwise, it is not. When the latency of all of the data blocks reaches the threshold level, a larger threshold level is taken.

Main request

2. Admission

The main request was amended after the board issued the summons to oral proceedings. The board decided to admit the amended main request into the proceedings (Article 13 RPBA) because it addresses objections raised by the board for the first time in its communication under Article 15(1) RPBA.

3. Amendments - Article 123(2) EPC

3.1 The characterising portion of the current claim 1 reads as follows:

> "characterized in that multiple levels of threshold are set to values according to the warning value, each level of threshold is less than the warning value and the multiple levels of threshold are

arranged in ascending order, and a process for determining the data block to-be-operated comprises:

determining whether a latency of a data block selected randomly from the solid state disk reaches to a current level of threshold;

taking the selected data block as the data block to-be-operated when the latency of the selected data block does not reach the current level of threshold;

avoiding to perform the operation on the selected data block when the latency of the selected data block reaches the current level of threshold, and performing the operation on another data block so that all data blocks reach the current level of threshold;

when all the data blocks in the solid state disk reach to the current level of threshold, taking a level of threshold larger than and next to the current level of threshold as a new current level of threshold".

3.2 All of the features in the characterising portion of the current claim 1 have been added to claim 1 as filed. In its letter dated 10 February 2017, the appellant made reference to paragraphs 69 to 71 on pages 11 and 12 of the description as the basis for these amendments. In its letter dated 25 February 2022, the appellant then submitted further arguments.

3.3 The objections set out in sections 8.4, 8.5 and 8.7 of the board's communication under Article 15(1) RPBA have been overcome by the amendments.

3.4 However, the objection presented in section 8.6 has not been overcome.

3.5 The description does not explicitly disclose any current level of threshold, new current level of threshold or taking a level of threshold larger than and next to the current level of threshold as the new current level of threshold. It is not apparent why the first level of threshold in paragraph 70 "can be taken as the current level of threshold", as argued by the appellant in the middle of page 2 of its letter dated 10 February 2017.

3.6 The first part of paragraph 70, to which the appellant referred, reads as follows:

> "Specifically, referring to FIG. 3, according to requirements, a first level of threshold may be set to 6 ms, a second level of threshold may be set to 7 ms, a third level of threshold may be set to 8 ms, and a fourth level of threshold may be set to 9 ms. When an erase and write operation is performed initially, an operation may be performed on any Block randomly; when a latency of a data block is about to reach the first level of threshold, it is avoided that an operation is performed on the data block, and an operation is performed on another Block, so that the Blocks all reach the first level of threshold. After the Blocks all reach the first level of threshold, on the premise that it is ensured that the latencies are less than the second level of threshold, an operation may be performed on the Blocks randomly, and so on, to ensure that load balancing is performed on the Blocks according to the threshold, so as to increase the service life of an SSD".

3.7 The appellant provided detailed arguments based on this passage. It explained that in the example given, four specific levels of threshold were arranged in ascending order. The data blocks were compared to the current

level of threshold, which was the first level in the example, and when all of the data blocks reached this level, the threshold was increased to a new current level of threshold, which was the second level in the example. The current level of threshold was the level which was currently being used, and the new current level of threshold was the level above the current level of threshold that was moved to after all of the data blocks had reached the current level of threshold.

3.8 These arguments are not convincing.

The board agrees that the duration values (6 ms, etc.) were provided as examples and that these values indicate that the values ascend.

However, the description discloses four levels of threshold values, while claim 1 only refers to a current threshold value and a new current threshold value. Furthermore, the passage reproduced above teaches explicitly with regard to the second level that "after the Blocks all reach the first level of threshold, on the premise that it is ensured that the latencies are less than the second level of threshold, an operation may be performed on the Blocks randomly". Assuming, for the sake of argument, in line with the appellant's submission, that the second level corresponds to the new current level of threshold as claimed, claim 1 merely specifies that a level of threshold larger than and next to the current level of threshold is taken as the new current level of threshold. The function of the second level (or of the new current level of threshold, as claimed), i.e. that the latencies are less than the second level of threshold when an operation is performed on a block, do not form part of the claim. The board holds that there is no basis in the application as translated for introducing a new current level of threshold without

introducing its main function as disclosed in the description.

3.9 For these reasons, claim 1 as amended does not meet the requirements of Article 123(2) EPC.

3.10 Consequently, the main request is not allowable.

First auxiliary request

4. Amendments - Article 123(2) EPC

The objection set out in section 3. above also applies to the first auxiliary request, which is therefore not allowable.

Second auxiliary request

5. Amendments - Article 123(2) EPC

The objection set out in section 3. above also applies to the second auxiliary request, which is therefore not allowable. The additional wording at the end of claim 1, i.e. "such that all the blocks reach the threshold at the same time", does not change this objection.

Conclusion

None of the requests on file meets the requirements of the EPC. Thus, the appeal is not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Götz-Wein A. Ritzka

Decision electronically authenticated