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**Datasheet for the decision
of 17 July 2018**

Case Number: T 2018/11 - 3.5.05

Application Number: 07797739.5

Publication Number: 2021904

IPC: G06F3/06

Language of the proceedings: EN

Title of invention:

SYSTEM AND METHOD FOR RAID MANAGEMENT, REALLOCATION, AND
RESTRIPING

Applicant:

Dell International L.L.C.

Headword:

RAID scores - I/DELL

Relevant legal provisions:

EPC Art. 83

EPC R. 42(1)(e)

RPBA Art. 13(1)

Keyword:

Sufficiency of disclosure - (no)

Amendments - appeal proceedings

Decisions cited:

Catchword:



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Case Number: T 2018/11 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 17 July 2018

Appellant: Dell International L.L.C.
(Applicant) 1 Dell Way
Round Rock TX 78682 (US)

Representative: Round, Edward Mark
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 10 June 2011
refusing European patent application No.
07797739.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair A. Ritzka
Members: E. Konak
D. Prietzel-Funk

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the application because of added subject-matter (Article 123(2) EPC) and lack of novelty (Article 54(1) and (2) EPC) with regard to the following document:

D2: US 2002/103969 A1.

II. With its statement setting out the grounds of appeal, the appellant filed claims of a main and a first and a second auxiliary request. It requested that the decision be set aside and a patent granted on the basis of the requests on file. Oral proceedings were requested as a further auxiliary measure.

III. In its preliminary opinion annexed to a summons to oral proceedings, the board raised objections under Articles 123(2), 84, 83 and 56 and Rule 42(1)(e) EPC.

IV. In reply to the summons to oral proceedings, the appellant filed claims of a new main request and new auxiliary requests 1 and 2. It requested that its former requests on file be renumbered as auxiliary requests 3 to 5.

V. Claim 1 of the main request and auxiliary request 1 are identical and read as follows:

"A method of data migration in a disk drive system (100), comprising:
selecting a RAID device for migration from a plurality of RAID devices based on a comparison between an

initial score and at least one second score calculated for each of the plurality of RAID devices, wherein: the initial score is that of the RAID device in its present state and is calculated based on one or more scoring factors; and the at least one second score is that of at least one hypothetical RAID device that could be created in available disk space and is calculated based on one or more scoring factors; for the selected RAID device, if one of the at least one second score is better than the initial score, the method further comprises: creating at least one alternative RAID device based on one of the at least one hypothetical RAID device; and moving data (408) stored at the selected RAID device to the at least one alternative RAID device; and removing the selected RAID device."

VI. Claim 1 of auxiliary request 2 reads as follows:

"A method of data migration in a disk drive system, comprising the steps of: selecting a RAID device for migration based on at least one score calculated for each of the plurality of RAID devices; creating at least one alternate RAID device; moving data stored at the selected RAID device to the at least one alternate RAID device; and removing the selected RAID device; wherein at least one of the scores comprises an initial score and a replacement score, wherein the initial score relates to the RAID device and the replacement score relates to at least one first hypothetical RAID device that could be created in available disk space; wherein at least one of the scores comprises an overlay score relating to at least one hypothetical RAID device

that could be created in a combination of available disk space and the disk space taken up by the RAID device;

wherein the initial score, replacement score and overlay score are each calculated based on at least one of factors comprising the RAID level, RAID stripe size, RAID extent size, disk category, location on disk, disk enclosure, disk enclosure power supply, and communication path to the disk;

and wherein selecting a RAID device for migration based on at least one score calculated for each of a plurality of RAID devices comprises selecting the RAID device if at least one of the replacement score or overlay score is better than the initial score."

VII. Claim 1 of auxiliary request 3 differs from claim 1 of the main request and auxiliary request 1 as follows (with additions underlined and deletions ~~struck through~~):

"A method of ~~data migration~~ RAID restriping in a disk drive system (100), comprising:

...

the at least one second score is that of at least one hypothetical RAID device ~~that could be created~~ located in available disk space and is calculated based on one or more scoring factors;

~~for the selected RAID device, if one of the at least one second score is better than the initial score, the method further comprises:~~

creating at least one alternative RAID device based on one of the at least one hypothetical RAID device; and if the score of the alternative RAID device is better than that of the selected RAID device moving data (408) stored at the selected RAID device to the at least one alternative RAID device; and

removing the selected RAID device."

- VIII. Claim 1 of auxiliary request 4 differs from claim 1 of auxiliary request 2 as follows (with additions underlined and deletions ~~struck through~~):

"A method of ~~data migration~~ RAID restriping in a disk drive system, comprising the steps of:

...

wherein at least one of the scores comprises an initial score and a replacement score, wherein the initial score relates to the RAID device and the replacement score relates to at least one first hypothetical RAID device ~~that could be created~~ located in available disk space;

wherein at least one of the scores comprises an overlay score relating to at least one hypothetical RAID device ~~that could be created~~ located in a combination of available disk space and the disk space taken up by the RAID device;

...

~~and wherein selecting a RAID device for migration based on at least one score calculated for each of a plurality of RAID devices comprises selecting the RAID device if at least one of the replacement score or overlay score is better than the initial score."~~

- IX. Claim 1 of auxiliary request 5 differs from claim 1 of auxiliary request 4 as follows (with additions underlined and deletions ~~struck through~~):

"...

wherein the at least one ~~of the~~ scores comprises an initial score and a replacement score, wherein the initial score relates to the RAID device and the replacement score relates to at least one first

hypothetical RAID device located in available disk space;
wherein the at least one ~~of the~~ scores further comprises an overlay score relating to at least one hypothetical RAID device located in a combination of available disk space and the disk space taken up by the RAID device;
..."

Reasons for the Decision

1. Sufficiency of disclosure
 - 1.1 The application does not disclose how the "scores" compared to select a RAID device for migration are calculated. The application discloses some lists of factors, called "scoring factors", that might be taken into account for score calculation and some rough guidelines as to whether a higher or a lower value for certain scoring factors might be more desirable (see in particular paragraphs [065] to [069]), but it discloses neither which subsets of these numerous scoring factors are useful, nor the numerical correlation or mathematical relationship between the individual scoring factors and the final score values.
 - 1.2 Rule 42(1)(e) EPC requires that at least one way of carrying out the invention claimed be described in the description, using examples. The only disclosure in the description that comes close to qualifying as an example of score calculation is in Table 2, which, according to paragraph [073], "illustrates an example RAID device scoring, for configuration shown in Figure 5".

- 1.3 Table 2 includes three columns, labelled "Score", "Replacement" and "Overlay", which contain example values for the initial score, the replacement score and the overlay score of the RAID devices P, Q, R, S and T depicted in figure 5. It is, however, not disclosed at all how these scores were calculated, nor even which scoring factors were used for their calculation.
- 1.4 The appellant argued at the oral proceedings with reference to paragraph [066], which states that "the score may be a number of disks used by the RAID device less fragmentation and parameter issues", that the score in Table 2 was clearly the number of disks used by the RAID device. When asked why, then, device T had a replacement score value of 2, which according to paragraph [066] is "the maximum score of a RAID device that could be constructed from existing free space", the appellant explained with reference to figure 5 that RAID device T could be migrated to available space on disks 3 and 4 by splitting it into two.
- 1.5 These explanations, however, fail to convince the board. First of all, the board cannot see how the skilled person would single out the number of disks from paragraph [066] as the scoring factor used in Table 2 in the absence of any reference to the number of disks in the part of the description explaining Table 2 and figure 5, i.e. paragraph [073]. The description mentions numerous other scoring factors, of which RAID level, RAID stripe size, RAID extent size, disk category, location on disk, disk enclosure, disk enclosure power supply and communication path to the disk are mentioned in the claims (claim 4 of the main request and auxiliary request 3, claim 3 of auxiliary request 1, claim 1 of auxiliary requests 2, 4 and 5); the number of disks, by contrast, is never mentioned in

the claims. Even assuming, for the sake of argument, that the skilled person were to make a connection between the sentence in paragraph [066] cited by the appellant and paragraph [073], it would not be clear to the skilled person what the cited sentence means by the enigmatic statement "less fragmentation and parameter issues". These deficiencies in the disclosure of the only example in the description mean that the person skilled in the art cannot carry out the invention without undue burden.

1.6 The appellant further argued that Table 2, as stated in paragraph [073], is "not limiting and any scoring combination may result in marking a RAID device for migration or no migration". There were other examples of score calculation in e.g. paragraphs [066] and [068] and Table 1. The skilled person would be well aware of which scoring factors would be preferable and the scores could be calculated using any suitable mathematical formula. It was not necessary to disclose a particular formula for score calculation, as the invention lay in the comparison of data for existing devices with data for hypothetical devices that had not yet been created, and not in the score calculation.

1.7 These arguments again fail to convince the board. The passages cited by the appellant do not give examples of score calculation, but list scoring factors that might be taken into account for score calculation and some rough guidelines as to whether a higher or a lower value for certain scoring factors might be more desirable. The board cannot see how the invention can be deemed to be sufficiently disclosed if the method of score calculation required at the very outset of the invention is not disclosed.

2. Conclusion

2.1 In its preliminary opinion annexed to the summons to oral proceedings, the board raised objections under *inter alia* Article 83 and Rule 42(1)(e) EPC to the then main and first and second auxiliary requests. As the board is not convinced by the submissions in defence, it maintains these objections and judges that these requests, now renumbered as auxiliary requests 3 to 5, do not meet the requirements of Article 83 and Rule 42(1)(e) EPC.

2.2 The main request and auxiliary requests 1 to 2 were filed in reply to the summons, and thus after the appellant had filed its grounds of appeal, and may thus be admitted at the board's discretion (Article 13(1) RPBA). Among the criteria used by the boards of appeal to decide on the admissibility of such requests is whether the requests address still outstanding objections (see Case Law of the Boards of Appeal, 8th edition 2016, IV.E.4.4.1). As the main request and auxiliary requests 1 to 2 do not overcome still outstanding objections under Article 83 and Rule 42(1)(e) EPC, the board exercises its discretion under Article 13(1) RPBA not to admit them into the appeal proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated