

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)**

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2018/015119

International filing date (day/month/year)
25.01.2018

Priority date (day/month/year)
02.02.2017

International Patent Classification (IPC) or both national classification and IPC
INV. G06F9/455 G06F9/50

Applicant
MICROSOFT TECHNOLOGY LICENSING, LLC

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of this opinion

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-15</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-15</u>
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

1 The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: US 9 436 493 B1 (THOMAS NATHAN [US] ET AL) 6 September 2016 (2016-09-06)

D2: US 2014/282520 A1 (SABHARWAL NAVIN [IN]) 18 September 2014 (2014-09-18)

2 Lack of inventive step, Article 33(3) PCT

2.1 The present application does not meet the requirements of Article 33(3) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

2.2 The document D1 discloses (the references in parentheses applying to this document, features not disclosed in D1 are set in ~~strike~~through):

A method implemented by a host device (*fig. 4.*), the method comprising: obtaining, from a ~~GPU~~-partition requestor, a request for a virtual machine with ~~graphics processing unit (GPU) functionality (fig. 4, 402), the GPU functionality being represented by a model having a plurality of segments that represent different GPU capabilities,~~ and the request requesting the GPU functionality by specifying the different GPU capabilities (*fig. 4, 404*); determining whether ~~GPUs~~ [resources] of the host device are available to provide the GPU functionality based on the specified GPU capabilities (*implicit in D1 because capabilities which are not available cannot be allocated*); responsive to a determination that at least a portion of the ~~GPUs~~ [resources] are available to provide the GPU functionality (*implicit in D1 as only available resources can be allocated*), allocating the determined available portion of the ~~GPUs~~ [resources] to the virtual machine to configure the virtual machine with a GPU partition having the GPU functionality (*fig. 4, 408*); and exposing the virtual machine with the GPU partition having the GPU functionality to the ~~GPU~~-partition requestor (*fig. 4, 408*).

- 2.3 The subject-matter of claim 1 therefore differs from this known method of D1 in that:
- the requestor requests GPU resources and functionality;
 - the GPU functionality is represented by a model having a plurality of segments that represent different GPU capabilities, and the request requests the GPU functionality by specifying the different GPU capabilities.
- 2.4 The objective technical problem to be solved by the present invention may therefore be regarded as how to apply the teachings of D1 to a specific kind of computing resource.
- 2.5 The solution proposed in claim 1 of the present application cannot be considered to involve an inventive step (Articles 33(3) PCT), for the following reasons:
- D1 already suggests that the resource request parameters can comprise the availability of a GPU, see column 12, lines 36-37. Furthermore, it is known from common general knowledge that a request for a VM with various capabilities can be represented by a model that shows each capability as a separate "segment". Such segments as "CPU", "RAM" and "storage" are all well-known and also considered by D1, columns 13-14.
- While segmenting specific capabilities of a GPU such as CPU processing, GPU RAM and encode/decode capabilities is not taught by the available prior art, all of these capabilities were as such well-known to the skilled person at the priority date of the present application.
- Since claim 1 does not disclose any special technical features of the GPU allocation method, it is considered that the skilled person aware of D1 and his common general knowledge would have, when looking for a solution to the objective technical problem, arrived at the subject-matter of claim 1 without an inventive step because it amounts to a straightforward application of known concept of capability-based resource reservation to an otherwise known resource, i.e. the GPU.
- 2.6 Essentially the same objections also apply to corresponding independent claim 12.
- 2.7 Dependent claims 2-11 and 13-15 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to inventive step because they disclose only slight constructional changes in the method/

system of the independent claims they refer to, which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of said claims also lacks an inventive step.

- 2.8 It is noted that the same conclusions can be reached when starting from document D2 as the closest prior art (see paragraphs [0003],[0038]-[0040], [0123]-[0126]).