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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MAURICIO BRETERNITZ JR. and LEONARDO PIGA

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Appeal 2019-002061  
Application 14/568,181  
Technology Center 2400

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Before JOHN A. EVANS, JOHN P. PINKERTON, and  
MICHAEL M. BARRY, *Administrative Patent Judges*.

EVANS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner’s decision to reject Claims 1–20, which constitute all pending claims. Appeal Br. 28–32 (Claims App.). We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.<sup>2</sup>

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<sup>1</sup> We use “Appellant” to refer to the “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Advanced Micro Devices, Inc. as the real party in interest. Appeal Br. 1.

<sup>2</sup> Rather than reiterate the arguments of Appellant and the Examiner, we refer to the Appeal Brief (filed October 4, 2018, “Appeal Br.”), the Reply Brief (filed January 11, 2019, “Reply Br.”), the Examiner’s Answer (mailed November 13, 2018, “Ans.”), the Final Office Action (mailed March 22, 2018, “Final”), and the Specification (filed December 12, 2014, and as amended on November 29, 2016 and June 15, 2017, “Spec.”) for their respective details.

## STATEMENT OF THE CASE

The disclosed and claimed invention “relates generally to processing systems and more particularly to data storage at a cluster compute server.”  
Spec. ¶ 1.

### *Invention*

Claims 1, 11, and 15 are independent. Claim 1 is illustrative and is reproduced below.

1. A server system, comprising:
  - a fabric interconnect;
  - a plurality of compute nodes coupled to the fabric interconnect to execute services for the server system, each of the plurality of compute nodes coupled to a corresponding dedicated storage volume, the corresponding dedicated storage volume storing configuration data modified by its compute node; and
  - a common storage volume coupled to the plurality of compute nodes, the common storage volume storing default configuration data that corresponding compute nodes do not modify, wherein:
    - in response to a first read request from a first compute node of the plurality of compute nodes targeted to a first location of the common storage volume, the common storage volume provides data stored at the first location to the first compute node; and
    - in response to a first write request from the first compute node targeted to the first location of the common storage volume of the first compute node, the first compute node writes data to a location of a first corresponding dedicated storage volume indicated by the first write request.

Appeal Br. 28 (Claims App.).

*References*

<b>Name</b>	<b>Reference</b>	<b>Date</b>
Kiselev	US 6,839,740 B1	Jan. 4, 2005
Colgrove et al. ("Colgrove")	US 2013/0097380 A1	Apr. 18, 2013
Veerla et al. ("Veerla")	US 2015/0143164 A1	May 21, 2015
Goel et al. ("Goel")	US 2015/0212760 A1	July 30, 2015
Watanabe et al. ("Watanabe")	US 2017/0024142 A1	Jan. 26, 2017
Wang et al. ("Wang")	US 9,619,429 B1	Apr. 11, 2017

*Rejections*

The Examiner rejected Claims 1–20 under 35 U.S.C. § 101 as directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more. Final 2–8.

The Examiner rejected Claims 1, 2, 5–7, 10, 15, 16, 19, and 20 under 35 U.S.C. § 103 as being unpatentable over Veerla and Goel. *Id.* at 9–20.

The Examiner rejected Claims 3 and 17 under 35 U.S.C. § 103 as being unpatentable over Veerla, Goel, and Watanabe. *Id.* at 20–21.

The Examiner rejected Claims 4 and 18 under 35 U.S.C. § 103 as being unpatentable over Veerla, Goel, Watanabe, and Colgrove.<sup>3</sup> *Id.* at 22.

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<sup>3</sup> The Final Office Action states that claims 4 and 18 stand rejected as unpatentable over the combination of Veerla, Goel, and Colgrove. Final 22. Claims 4 and 18, however, depend from claims 3 and 17, respectively, which stand rejected as unpatentable over the combination of Veerla, Goel, and Watanabe. *Id.* at 20–21. Accordingly, because the Final Office Action relies on findings from Veerla, Goel, Watanabe, and Colgrove to meet the elements of claims 4 and 18 (including all of the elements of parent claims 3 and 17, respectively), along with a rationale to combine Veerla, Goel,

The Examiner rejected Claims 8 and 9 under 35 U.S.C. § 103 as being unpatentable over Veerla, Goel, and Kiselev. *Id.* at 23–25.

The Examiner rejected Claims 11–14 under 35 U.S.C. § 103 as being unpatentable over Veerla, Goel, and Wang. *Id.* at 26–32.

## ANALYSIS

### I. CLAIMS 1–20: PATENT-ELIGIBLE SUBJECT MATTER.

Appellant argues the § 101 rejection of Claims 1–20 as a group. Appeal Br. 4–21; Reply Br. 2–10. Therefore, we analyze the § 101 rejection of Claims 1–20 with reference to illustrative Claim 1<sup>4</sup> and refer to the rejected claims collectively herein as “the claims.” *See* 37 C.F.R. § 41.37(c)(1)(iv); *In re Marco Guldenaar Holding B.V.*, 911 F.3d 1157, 1162 (Fed. Cir. 2018).

We have reviewed the record *de novo*. *SiRF Tech., Inc. v. Int’l Trade Comm’n*, 601 F.3d 1319, 1331 (Fed. Cir. 2010) (“Whether a claim is drawn to patent-eligible subject matter is an issue of law that we review *de novo*.”). Based on our review of the record in light of recent guidance on patent subject matter eligibility under 35 U.S.C. § 101,<sup>5</sup> we decline to sustain the §

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Watanabe, and Colgrove, we consider claims 4 and 18 as rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Veerla, Goel, Watanabe, and Colgrove. We treat this irregularity in the record to be a harmless, ministerial error.

<sup>4</sup> Our § 101 analysis for claim 1 applies with equal force to claims 2–20, which are argued together with claim 1.

<sup>5</sup> USPTO, *2019 Revised Patent Subject Matter Eligibility Guidance*, 84(4) Fed. Reg. 50–57 (Jan. 7, 2019) (“Revised Guidance” or “Rev. Guid.”); *see also* USPTO, *October 2019 Patent Eligibility Guidance Update* (Oct. 17, 2019), [https://www.uspto.gov/sites/default/files/documents/peg\\_oct\\_2019\\_update.pdf](https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf) (“Oct. 2019 Update”).

101 rejection of Claims 1–20, as discussed in greater detail below.

*A. 35 U.S.C. § 101*

Section 101 provides that a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 35 U.S.C. § 101. The Supreme Court has long recognized, however, that § 101 implicitly excludes “[l]aws of nature, natural phenomena, and abstract ideas” from the realm of patent-eligible subject matter, as monopolization of these “basic tools of scientific and technological work” would stifle the very innovation that the patent system aims to promote. *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)); see also *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–78 (2012); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

Under the mandatory Revised Guidance, we consider whether Appellant’s claims recite:

1. any **judicial exceptions**, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human interactions such as a fundamental economic practice, or mental processes); and
2. **additional elements** that integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h)).

Only if a claim, (1) recites a judicial exception, and (2) does not integrate that exception into a practical application, do we then reach the issue of whether the claim:

3. adds a specific limitation beyond the judicial exception that is not

- “**well-understood, routine, conventional**” in the field (*see* MPEP § 2106.05(d)); or
4. simply appends well-understood, routine, conventional activities previously known to the industry, **specified at a high level of generality**, to the judicial exception.

*B. Step 2A(i): Whether the claims recite a judicial exception*

The Revised Guidance extracts and synthesizes key concepts identified by the courts as abstract ideas to explain that the abstract-idea exception includes the following groupings of subject matter, when recited as such in a claim limitation(s) (that is, when recited on their own or *per se*): (a) mathematical concepts,<sup>6</sup> i.e., mathematical relationships, mathematical formulas, equations,<sup>7</sup> and mathematical calculations<sup>8</sup>; (b) certain methods of organizing human activity—fundamental economic principles or practices (including hedging, insurance, mitigating risk); commercial or legal interactions (including agreements in the form of contracts; legal obligations; advertising, marketing or sales activities or behaviors; business relations); managing personal behavior or relationships or interactions between people (including social activities, teaching, and following rules or

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<sup>6</sup> *Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“The concept of hedging . . . reduced to a mathematical formula . . . is an unpatentable abstract idea.”).

<sup>7</sup> *Diehr*, 450 U.S. at 191 (“A mathematical formula as such is not accorded the protection of our patent laws”); *Parker v. Flook*, 437 U.S. 584, 594 (1978) (“[T]he discovery of [a mathematical formula] cannot support a patent unless there is some other inventive concept in its application.”).

<sup>8</sup> *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding that claims to a “series of mathematical calculations based on selected information” are directed to abstract ideas).

instructions)<sup>9</sup>; and (c) mental processes—concepts performed in the human mind (including observation, evaluation, judgment, opinion).<sup>10</sup>

The preamble of independent claim 1 recites “[a] server system comprising.” The steps recited in the body of the claim are analyzed in Table I against the groupings of abstract ideas as set forth in the Revised Guidance.

Claim 1	Revised Guidance
[a] <sup>11</sup> a fabric interconnect;	Does not fall within any of the mathematical concepts, certain methods of organizing human activity, or mental processes groupings of subject matter. <i>See</i> Rev. Guid., 84 Fed. Reg. at 52.
[b] a plurality of compute nodes coupled to the fabric interconnect to execute services for the server system, each of the plurality of compute nodes coupled to a corresponding dedicated storage volume, the corresponding dedicated storage volume storing configuration data modified by its compute node; and	<i>Id.</i>
[c] a common storage volume coupled to the plurality of compute	<i>Id.</i>

<sup>9</sup> *Alice*, 573 U.S. at 219–20 (concluding that use of a third party to mediate settlement risk is a “fundamental economic practice” and thus an abstract idea); *see* Rev. Guid., 84 Fed. Reg. at 52 n.13 for a more extensive listing of “certain methods of organizing human activity” that have been found to be abstract ideas.

<sup>10</sup> *Mayo*, 566 U.S. at 71 (“[M]ental processes[ ] and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.” (Quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972))).

<sup>11</sup> Step designators, e.g., “[a],” are added to facilitate discussion.



<p>nodes, the common storage volume storing default configuration data that corresponding compute nodes do not modify, wherein:</p>	
<p>[d] in response to a first read request from a first compute node of the plurality of compute nodes targeted to a first location of the common storage volume, the common storage volume provides data stored at the first location to the first compute node; and</p>	<p><i>Id.</i></p>
<p>[e] in response to a first write request from the first compute node targeted to the first location of the common storage volume of the first compute node, the first compute node writes data to a location of a first corresponding dedicated storage volume indicated by the first write request.</p>	<p><i>Id.</i></p>

In view of Table I, steps [a]–[e] of claim 1 recite a computer server architecture with specific computing elements including a fabric interconnect, a plurality of compute nodes, each having a corresponding dedicated storage volume and being coupled to the fabric interconnect for executing services, and a common storage volume coupled to the compute nodes. The claim describes a computerized technique with a specific set of rules for redirecting the writing of data—that was targeted for a common storage volume—to a dedicated storage volume of a corresponding compute node.

We agree with Appellant that, like the claims in *DDR*,<sup>12</sup> the claims here “recite language familiar to the technical reader and one of ordinary skill in the art” and “solve a problem specifically arising in the realm of computer networks.” Appeal Br. 15. As Appellant explains, the claims

are directed to substantially reducing storage requirements in a server, thereby allowing a cluster compute server to “operate with smaller storage devices or to make more efficient use of existing storage devices,” . . . reducing “the number of components implemented at each compute node, which in turn enables the compute nodes to have a smaller form factor while consuming less energy than [a] conventional server.”

*Id.* (citing Spec. ¶¶ 11, 16). Contrary to the Examiner’s determinations, Claim 1 does not recite subject matter that falls within one of the enumerated groupings of subject matter identified as abstract ideas, i.e., mathematical concepts, certain methods of organizing human activity, or mental processes. *See* Final 4–6; Ans. 4–8. The Examiner’s characterization of claim 1 as reciting an abstract idea analogous to “classifying and storing digital images in an organized manner” or “migrating a user’s configuration settings from one computer to another computer” oversimplifies and does not fairly characterize the claim language. *See* Final 4–6; Ans. 4–8.

Thus, at prong one of Step 2A of the Guidance, we determine claim 1 does not recite a judicial exception, i.e., an abstract idea, and we terminate our analysis. Rev. Guid., 84 Fed. Reg. at 53. Accordingly, because we determine claim 1 is patent-eligible under 35 U.S.C. § 101, and claims 2–20

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<sup>12</sup> *DDR Holdings, LLC v. Hotels.com L.P.*, 773 F.3d 1245, 1257, 1259 (Fed. Cir. 2014).

include similar limitations, we decline to sustain the Examiner’s rejection of claims 1–20 under 35 U.S.C. § 101.

II. CLAIMS 1–20: OBVIOUSNESS.

The burden is on the Examiner to set forth a prima facie case of obviousness. *See, e.g., In re Glaug*, 283 F.3d 1335, 1338 (Fed. Cir. 2002). Here, we determine the Examiner’s evidence does not adequately support a prima facie case of obviousness. “[O]bviousness requires a suggestion of all limitations in a claim.” *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (citing *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)). In particular, the Examiner has not provided adequate evidence that the cited prior art teaches or suggests “in response to a first write request from the first compute node targeted to the first location of the common storage volume of the first compute node, the first compute node writes data to a location of a first corresponding dedicated storage volume indicated by the first write request,” as recited in independent Claim 1, and similarly recited in independent Claims 11 and 15. Appeal Br. 28, 30–31 (Claims App.).

Appellant argues that

the proposed combination of Veerla and Goel fails to describe or suggest all of the features of claims 1, 11, and 15 since neither Veerla nor Goel, nor their combination, teaches a mechanism of protecting a volume or aggregate from a write operation or redirecting access requests such as a write request to a particular volume or aggregate volume.

Appeal Br. 22. Appellant further argues that [t]he combination of Veerla and Wang fails to disclose or reasonably suggest all of the features of Claim 11, including . . . “the storage controller . . . configured to ‘**redirect** . . . [a first] access request **from** the common storage volume to . . . [a]

**corresponding dedicated storage volume** to fulfill the [first] access request.” *Id.* at 26. Appellant’s arguments are persuasive.

Goel teaches a shared storage architecture including container disks partitioned such that the partitions may be shared between nodes. *See* Goel ¶¶ 21, 27. With respect to the limitation at issue, the Examiner cites Goel’s disclosure that a write access to a particular partition may be provided only to the node with which the partition is associated. *See* Final 12–13 (citing Goel ¶ 27), *see also id.* at 11–13 (citing Goel ¶¶ 26, 46, 101); Goel ¶ 102. Although the cited disclosures of Goel may suggest the concept of requesting to write and writing data to a location in a corresponding dedicated storage volume, we find no evidence to suggest a write request targeted to the common storage volume but written instead to the corresponding dedicated storage volume.

Veerla discloses a clustered storage system having nodes operating on shared storage volumes. *See* Veerla ¶¶ 2–3. The Examiner finds that in Veerla, during the processing of a write request, a storage controller may detect a redirection condition due to a failover or a request to a storage device not owned by the storage controller. Final 27 (citing Veerla ¶¶ 2, 29, Fig. 1). In response, the storage controller may redirect the request by forwarding it to another controller for writing the data on a mirror storage device. *Id.* Although Veerla may suggest the concept of redirecting a write request from one storage device to a mirror storage device, we find no evidence to suggest a request targeted to a “common storage volume” as claimed, nor that the mirror storage device is a “corresponding dedicated storage volume” that may only be accessed by a corresponding compute node or virtual server. *See* Spec. ¶ 10 (“The dedicated storage volumes, in

contrast, store data to be accessed only by a corresponding compute node (or corresponding virtual server).”). We also find no evidence to suggest that Veerla teaches Claim 11’s requirement that the redirect operation be performed “responsive to an address of an access request not being stored at a modified locations entry.” The Specification describes a modified locations entry as corresponding to a location of the common storage volume that has been modified (written to) by the virtual server executing at a compute node. *See* Spec. ¶¶ 12, 33, 34. In addition, the modified locations entry may be stored in a table of modified locations. *Id.* ¶ 12. Although Veerla’s redirect operation may occur in response to an address not being stored at a target location, we find no evidence that the target location is a “modified locations entry” as the claim requires.

In rejecting Claim 11, the Examiner additionally relies on the disclosure of Wang. Final 26–30. Wang discloses a data storage system environment in which nodes are allocated to one or more tiered resource pools and addressable via a virtual address given for each tiered resource pool. Wang 1:7–8, 1:44–49. The Examiner finds that, in Wang, when an the tenant’s application moves to another node, the storage can also be moved to another storage node, such that the destination may be modified to the storage node’s IP address and forwarded to the port to which the storage node is connected for accessing the volume. Final 28–29 (citing Wang 4:14–21, 6:32–35, 6:47–61). But we find no evidence to suggest that Wang’s move operation is from a “common storage volume” to a “corresponding dedicated storage volume” as claimed. Nor are we persuaded that modifying the IP address of the storage node as part of the

move operation equates to performing the move operation “responsive to an address of an access request not being stored at a modified locations entry.”

In view of the foregoing, the Examiner has not shown that the cited prior art teaches or suggests the limitations at issue. Nor does the Examiner provide any persuasive reasoning or rationale to fill the gaps in the rejections. *See* Final 13, 21, 22, 24, 25, 28–32. Therefore, on this record, we determine the Examiner has failed to establish a prima facie case of obviousness for independent Claims 1, 11, and 15. Accordingly, we decline to sustain the Examiner’s § 103 rejection of independent Claims 1 and 11 over Veerla and Goel. We likewise decline to sustain the Examiner’s rejection of independent Claim 15 over Veerla, Goel, and Wang. For similar reasons, we also decline to sustain the Examiner’s § 103 rejections of dependent claims 2–10, 12–14, and 16–20, for which the Examiner fails to provide any finding or reasoning that cures the above deficiencies. *See id.* at 13–25, 30–32.

#### CONCLUSION

We REVERSE the rejection of claims 1–20 under 35 U.S.C. § 101.

We REVERSE the rejection of claims 1–20 under 35 U.S.C. § 103.

DECISION SUMMARY

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/ Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–20	101	Eligibility		1–20
1, 2, 5–7, 10, 15, 16, 19, 20	103	Veerla, Goel		1, 2, 5–7, 10, 15, 16, 19, 20
3, 17	103	Veerla, Goel, Watanabe		3, 17
4, 18	103	Veerla, Goel, Watanabe, Colgrove		4, 18
8, 9	103	Veerla, Goel, Kiselev		8, 9
11–14	103	Veerla, Goel, Wang		11–14
<b>Overall Outcome</b>				1–20

REVERSED