

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CHOLLA ENERGY LLC and OBM, INC.,
Petitioner,

v.

LANCIUM LLC,
Patent Owner.

IPR2024-01361
Patent 11,283,261 B2

Before AMBER L. HAGY, KARA L. SZPONDOWSKI, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

HAGY, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Cholla Energy LLC and OBM, Inc. (collectively, “Petitioner”) filed a petition requesting *inter partes* review (Paper 3, “Pet.”) of claims 1–16 (“the challenged claims”) of U.S. Patent No. 11,283,261 B2 (Ex. 1001, the “’261 patent”). *See* 35 U.S.C. § 311. Lancium LLC (“Patent Owner”) did not file a Preliminary Response.

Under 37 C.F.R. § 42.4(a), we have authority to determine whether to institute review. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Applying those standards, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing unpatentability of at least one challenged claim of the ’261 patent. We institute review on all challenged claims and on all grounds raised in the Petition.

Our findings of fact and conclusions discussed below are based on the evidentiary record developed thus far. This Decision to institute trial is not a final decision as to the patentability of any challenged claim. Any final decision will be based on the full record developed during trial.

B. Real Parties in Interest

Petitioner identifies Cholla Energy LLC and OBM, Inc., as the real parties in interest. Pet. 92.

Patent Owner identifies itself the real party in interest. Paper 4, 1.

C. Related Matters

Petitioner states that “[p]ursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of Petitioners, the ’261 patent is not involved in any pending cases, but was previously asserted” in the following matter: *Lancium LLC v. U.S. Data Mining Group, Inc. et al.*, No. 6:23-cv-00344 (W.D. Tex.). Pet. 92.

Patent Owner disagrees in part with Petitioner’s assertions, stating that the ’261 patent “has never been and is not currently involved in any judicial or administrative proceedings,” and further states that “the suit identified in the Petition . . . did not involve the ’261 patent, and instead raised seven other patents.” Paper 4, 1.

D. The ’261 patent (Ex. 1001)

The ’261 patent, titled “Managing Queue Distribution Between Critical Datacenter and Flexible Datacenter,” issued on March 22, 2022. Ex. 1001, codes (45), (54). The ’261 patent claims priority as a continuation of application No. 16/175,335, filed October 30, 2018, now U.S. Pat. No. 10,367,353. *Id.* at code (63). Petitioner does not dispute this priority claim for purposes of this proceeding. Pet. 14.

The ’261 patent is directed to a system that “includes a flexible datacenter comprising: a behind-the-meter power input system, a first power distribution system, a datacenter control system, and a first plurality of computing systems powered by the behind-the-meter power input system via

the first power distribution system.” Ex. 1001, 3:3–8. The ’261 patent generally describes a flexible datacenter. *Id.* at 6:42–61. Figure 2, reproduced below, depicts a “flexible datacenter.” *Id.* at 10:56–12:41.

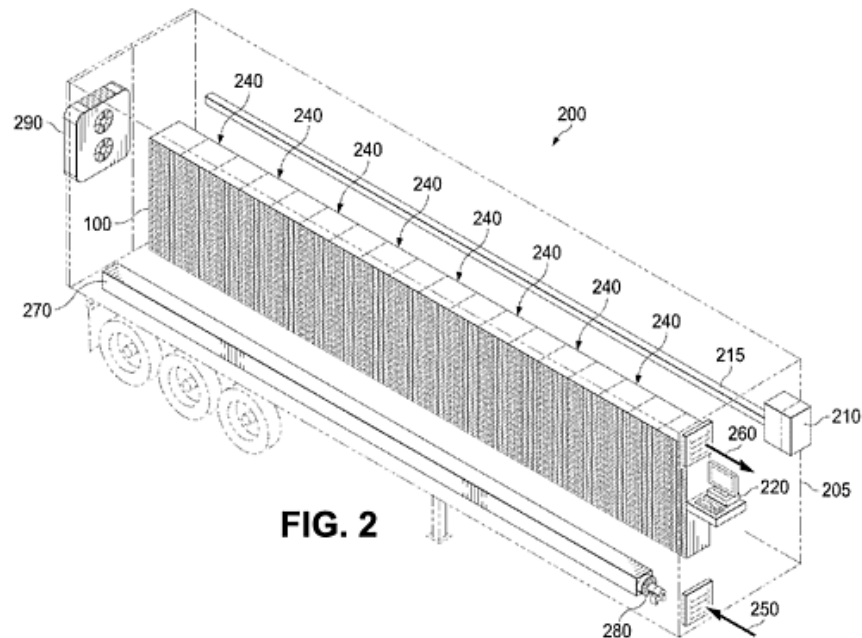


Figure 2 is a diagram depicting “a flexible datacenter” that “may use behind-the-meter power in order to provide processing abilities and other computing resources.” Ex. 1001, 6:48–50.

As depicted in Figure 2, flexible datacenter 200 includes behind-the-meter power input system 210, power distribution system 215, climate control (250, 260, 270, 280, 290), datacenter control system 220, and computing system 100 comprising racks (servers) 240. Ex. 1001, 10:56–11:3. Datacenter control system 220 is “configured to dynamically modulate power delivery to one or more computing systems 100 disposed within flexible datacenter 200 based on behind-the-meter power availability or an operational directive from a local station control system” or “a remote

master control system” or “a grid operator.” *Id.*¹ A flexible datacenter may be a mobile container, like a storage trailer on wheels or the ground, or a stackable, inflatable, or floatable container, or it may be “situated within a building.” *Id.* at 11:4–17.

The ’261 patent describes the “flexible datacenter” as able to be “configured to modulate power delivery to the plurality of computing systems based on one or more monitored power system conditions or an operational directive.” *Id.* at 3:8–12. A queue system, centralized or decentralized, manages computational operation distribution amongst datacenters. *Id.* at 6:62–66, 7:1–4, 7:21–24, 7:40–42, 26:51–27:1. The flexible datacenter “may use behind-the-meter power in order to provide processing abilities and other computing resources.” *Id.* at 6:48–50. “By using behind-the-meter power from renewable energy sources . . . a flexible datacenter can provide computing resources at very low costs.” *Id.* at 6:50–54.

E. Illustrative Claim

Of the challenged claims, claims 1 and 13 are independent. Challenged claims 2–12 depend, directly or indirectly, from claim 1, challenged claims 14–16 depend from claim 13. Claim 1, reproduced below (with bracketed numbering as added by Petitioner), illustrates the claimed subject matter:

¹ All bolding of reference numbers has been omitted in material quoted herein from the ’261 patent and the prior art references.

1. [1.0] A system comprising:
 - [1.1] a flexible datacenter that is positioned to receive electrical power directly from a power generation system without the received power flowing through a grid comprising;
 - [1.2] a behind-the-meter (“BTM”) power input system configured to receive power from the power generation system prior to the power undergoing step-up transformation for transmission to the grid and provide the received power to the flexible datacenter instead of sending the received power to the grid;
 - [1.3] a power distribution system; and
 - [1.4] a plurality of computing systems powered by the BTM power input system via the power distribution system;
 - [1.5] a queue system configured to organize a plurality of computational operations, wherein the queue system comprises multiple queue subsystems, and
 - [1.6] wherein each queue subsystem organizes a set of computational operations according to rules associated with the queue subsystem; and
 - [1.7] a routing control system configured to:
 - [1.8] determine, using the queue system, a computational operation to be performed;
 - [1.9] determine an amount of BTM power that is available to the plurality of computing systems;
 - [1.10] determine whether to route the computational operation to the flexible datacenter using the amount of BTM power that is available; and
 - [1.11] based on a determination to route the computational operation to the flexible datacenter, assign the computational operation for performance at the flexible datacenter.

Ex. 1001, 36:5–36.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–16 are unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1, 2, 9–12	103 ²	Kiani, ³ Pelio ⁴
4–8	103	Kiani, Pelio, Chapel ⁵
3	103	Kiani, Pelio, Belady ⁶
13–16	103	Kiani, Pelio, Chapel, Forestiero ⁷

As further support, Petitioner offers the Declaration of Tajana S. Rosing, Ph.D. Ex. 1003.

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including § 103. Because the ’261 patent has an effective filing date after the effective date of the applicable AIA amendments, we refer herein to the AIA version of § 103.

³ Kiani et al., “On the Fundamental Energy Trade-offs of Geographical Load Balancing,” in IEEE Communications Magazine, Vol. 55, No. 5 (2017) (Ex. 1005, “Kiani”).

⁴ U.S. Patent Pub. No. 2011/0316337 A1, published December 29, 2011 (Ex. 1006, “Pelio”).

⁵ U.S. Patent Pub. No. 2010/0145542 A1, published June 10, 2010 (Ex. 1007, “Chapel”).

⁶ U.S. Patent No. 8,849,469, issued September 30, 2014 (Ex. 1008, “Belady”).

⁷ Forestiero, “Hierarchical Approach for Efficient Workload Management in Geo-Distributed Data Centers,” in IEEE Transactions on Green Communications and Networking, Vol. 1, No. 1 (2016) (Ex. 1009, “Forestiero”).

II. ANALYSIS

A. *Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic, Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

⁸ We have no evidence of secondary considerations before us at this stage.

B. Level of Ordinary Skill in the Art

The level of skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Relying on the declaration testimony of Dr. Rosing, Petitioner asserts that a person of ordinary skill in the art “would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, mechanical engineering, or an equivalent, and two years of professional experience relating to green datacenters, including the use of renewable energy in powering datacenters, workload distribution amongst geographically distributed datacenters, and power management techniques for datacenters.” Pet. 15 (citing Ex. 1003 ¶¶ 20–22).

Patent Owner has not filed a preliminary response, and therefore Petitioner’s assessment is unchallenged at this stage.

For purposes of this institution decision, and based on the present record including the disclosure in the ’261 patent, we apply Petitioner’s definition of the level of ordinary skill in the art (*see* Pet. 15). We determine this level of skill comports with the qualifications a person would have needed to understand and implement the teachings of the ’261 patent and the prior art of record. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (noting that the prior art itself may reflect an appropriate level of skill in the art).

C. Claim Construction

In interpreting the claims of the '261 patent, we “us[e] the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. [§] 282(b).” *See* 37 C.F.R. § 42.100(b) (2024). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as would have been understood by one of ordinary skill in the art in light of the written description and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

Petitioner asserts “for the purposes of this proceeding and the grounds presented herein, no claim term requires express construction.” Pet. 15. As noted, Patent Owner has not submitted a preliminary response, and hence also does not propose any terms for construction at this stage.

For purposes of this Decision, we determine that no claim term requires express interpretation at this time. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (per curiam) (claim terms need to be construed “only to the extent necessary to resolve the controversy” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Overview of Cited References

1. Kiani (Ex. 1005)

Kiani is an IEEE Communications Magazine, Green Communications and Computing, article entitled “On the Fundamental Energy Trade-offs of Geographical Load Balancing.” Ex. 1005. Petitioner contends that Kiani was published in May 2017 and was publicly accessible on the IEEE Xplore website as of May 12, 2017. Pet. 16 (citing Ex. 1005, 1; Ex. 1021; Ex. 1003

¶¶ 50–51). Petitioner contends Kiani is prior art under 35 U.S.C. § 102(a)(1). *Id.* at 17.

Petitioner bears the burden at the institution stage “to identify, with particularity, evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential). We determine that, at this point in the case and for purposes of institution, and based on the totality of the evidence to date, Petitioner has submitted sufficient evidence to establish a reasonable likelihood that Kiani was publicly accessible before the critical date of the challenged patent, and, thus Petitioner has established a reasonable likelihood that the reference qualifies as a printed publication. In particular, the face of Kiani bears a copyright date of 2017, a publication date of May 2017, and a volume number in which it was published in an established journal (IEEE Communications Magazine). Ex. 1005; *see also Hulu* at 19 (noting that Petitioner had met its burden sufficiently for institution by submitting a copy of a reference that bore “a copyright date of 1990, a printing date of November 1992, and an ISBN date of 8/94,” and was part of “a textbook from an established publisher . . . and a well-known book series”).

Kiani is directed to cutting datacenters’ power consumption and improving datacenters’ energy efficiency, and also “improv[ing] the energy consumption at other components like network equipment, electrical power delivery and conversion, cooling, and lighting.” Ex. 1005, 1. Kiani discloses “green data centers . . . to cut down the electricity consumption and

its cost” and “also integrate[] renewable energy resources . . . into data centers,”⁹ allowing operators to assess the power usage effectiveness (PUE) metric and the carbon usage effectiveness (CUE) metric. *Id.* at 1–2. Kiani discloses that “the powerful data centers are generally deployed far away from a large majority of users,” and “front-end (FE) servers are co-located with users,” with “[e]ach FE server receiv[ing] requests from its nearby users and distribut[ing] the requests to the back-end servers at geo-dispersed data centers.” *Id.* at 2. “[E]ach FE server functions as a workload distribution center that manages the workload by distributing user requests to the appropriate data centers,” and the “selection of the appropriate data centers can be based on different parameters like server or content availability, the network distance between FE and data center, the efficiency of the data centers, the cost of the electricity, and availability of renewable energy.” *Id.*

2. *Pelio (Ex. 1006)*

Pelio is a U.S. Patent Application Publication entitled “Power Generation Data Center,” published on December 29, 2011. Ex. 1006, at codes (43), (54). Petitioner asserts that *Pelio* is prior art under 35 U.S.C. § 102(a)(1). Pet. 17.

Pelio discloses datacenters located at a power generation source in a manner “such that the power does not have to be stepped-up to transmission level and then stepped-down to distribution and end-users.” Ex. 1006 ¶¶ 2, 19. *Pelio* avoids the use of step-up transformers and step-down transformers

⁹ The different references discussed herein variously use “datacenter” or “data center.” Aside from quoted material, we use the single-word term “datacenter” herein, consistent with the usage in the ’261 patent.

employed by typical electrical power producers because each stepping up and stepping down of voltages with transformers and transmitting electrical power long distances leads to power losses due to heating. *Id.* ¶¶ 38–39. Instead of the typical electrical power system, Pelio’s system use flexible, just-in-time, modular datacenter 200, as shown in Figure 2 reproduced below. *Id.* ¶ 48.

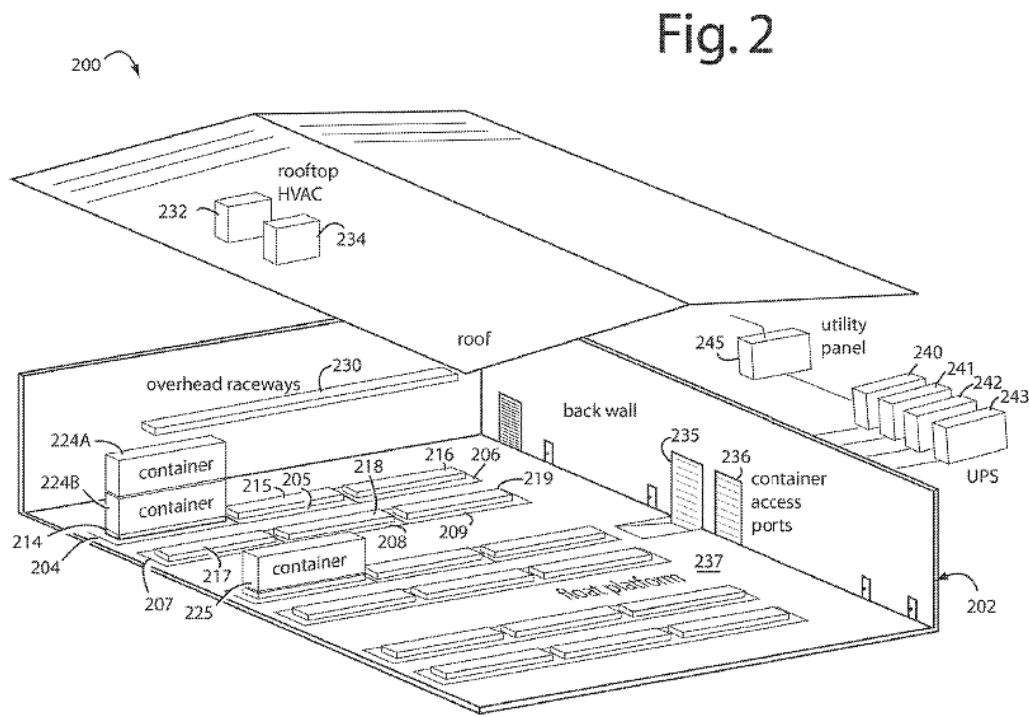


Figure 2 from Pelio depicts a flexible, just-in-time, modular datacenter showing containers placed on various designated floor spaces and supported by a modular infrastructure. Ex. 1005 ¶ 24.

Pelio’s modular datacenter 200, as depicted in Figure 2 above, includes common building shell 202 that is partitioned into floor spaces 204–209 and supports critical loads, as well as electro-mechanical adapters 214–219 for the floor spaces to allow for modular containerized datacenters 224A, 224B, and 225 as critical loads. *Id.* ¶¶ 48–49. In Pelio’s flexible modular datacenter, the containers are smaller than the typically large, open

rooms of traditional datacenters. *Id.* ¶¶ 55–56. This allows cooling to be localized, thus reducing the size of the cooling units needed as compared to the larger rooms of traditional datacenters, which necessitated cooling air to flow relatively long distances to cool the servers and then be exhausted from the large rooms. *Id.*

3. *Chapel (Ex. 1007)*

Chapel is a U.S. Patent Application Publication entitled “Smart Electrical Outlets and Associated Networks,” published on June 10, 2010, and claims priority to a provisional application filed on March 14, 2007. Ex. 1007, at codes (43), (54), (60). Petitioner contends that Chapel is prior art under 35 U.S.C. § 102(a)(1). Pet. 17.

Chapel discloses intelligent local circuit devices, or intelligent outlets, that control power delivered to an electrical device via a circuit. Ex. 1007 ¶¶ 47–48. An intelligent outlet includes standard receptacles, which receive standard electrical plugs and establish electrical connections between standard electrical plugs and wiring. *Id.* ¶ 48. Chapel discloses that these receptacles in the intelligent outlets also include a controller that monitors loading with respect to each receptacle, and controls delivery of power to the receptacles in order to alleviate safety concerns, enhance efficiency of power distribution, and address potential or actual over capacity conditions of a power grid. *Id.*

4. *Belady (Ex. 1008)*

Belady is a U.S. Patent entitled “Data Center System that Accommodates Episodic Computation,” and was issued on September 30, 2014. Ex. 1008, at codes (45), (54). Petitioner contends that Belady is prior art under 35 U.S.C. § 102(a)(1). Pet. 17.

Belady discloses a datacenter system that includes plural datacenters powered by plural power sources. Ex. 1008, 2:6–7. Each datacenter includes computational resources, cooling equipment, and networking coupling equipment. *Id.* at 5:46–6:22. The datacenters receive power from plural power sources, some of which correspond to renewable power sources, which can eliminate some of the infrastructure associated with conventional power distribution infrastructure. *Id.* at 6:43–7:4. For example, the use of power transformation equipment can be eliminated or reduced, which reduces associated power losses and transmission limits. *Id.* at 7:1–9.

5. *Forestiero* (Ex. 1009)

Forestiero is an IEEE Transactions on Green Communications and Networking paper entitled “Hierarchical Approach for Efficient Workload Management in Geo-Distributed Data Centers.” Ex. 1009. Petitioner contends that *Forestiero* was published in 2016 and was publicly accessible on the IEEE Xplore website as of August 31, 2016. Pet. 17 (citing Ex. 1009, 1; Ex. 1022; Ex. 1003 ¶¶ 280–282). Petitioner contends *Forestiero* is prior art under 35 U.S.C. § 102(a)(1). *Id.*

As noted above, Petitioner bears the burden at the institution stage “to identify, with particularity, evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu* at 13. We determine that, at this point in the case and for purposes of institution, and based on the totality of the evidence to date, Petitioner has submitted sufficient evidence to establish a reasonable likelihood that *Forestiero* was publicly accessible

before the critical date of the challenged patent, and, thus Petitioner has established a reasonable likelihood that the reference qualifies as a printed publication. In particular, the face of Forestiero bears a copyright date of 2016, a publication date of March 2017, and a volume number in which it was published in an established journal (IEEE Transactions on Green Communications and Networking). Ex. 1009; *see also Hulu* at 19 (noting that Petitioner had met its burden sufficiently for institution by submitting a copy of a reference that bore “a copyright date of 1990, a printing date of November 1992, and an ISBN date of 8/94,” and was part of “a textbook from an established publisher . . . and a well-known book series”).

Forestiero is directed to the “efficient utilization of resources in the data centers.” Ex. 1009, 1. Forestiero discloses “a hierarchical framework for the efficient distribution of the workload on a multi-site platform” that “allows for an integrated and homogeneous management of heterogeneous platforms” while “preserv[ing] the autonomy of single sites.” *Id.* at 2. Forestiero utilizes a framework “composed of two layers: at the *lower layer*, each site adopts its own strategy to distribute and consolidate the workload internally,” and “[a]t the *upper layer*, a set of algorithms – shared by all the sites – are used to evaluate the behavior of single sites and distribute the workload among them.” *Id.*

E. Asserted Obviousness

*1. Ground 1: Obviousness of Claims 1, 2, and 9–12
over the Combination of Kiani and Pelio*

Petitioner contends that claims 1, 2, and 9–12 are unpatentable under 35 U.S.C. § 103 over the combined teachings of Kiani and Pelio. Pet. 18–53. Patent Owner has not submitted a preliminary response and, therefore, does not challenge Petitioner’s showing at this stage.

For the reasons explained herein, we are persuaded, on this record, that Petitioner has established a reasonable likelihood of establishing unpatentability of at least one of these claims on this basis.

a. Motivation To Combine Kiani and Pelio

As a precursor to its obviousness analysis, Petitioner articulates reasons why the ordinarily skilled artisan would have combined the teachings of Kiani and Pelio in the manner proposed by Petitioner. Pet. 21–26. Petitioner contends: (1) Kiani and Pelio are both analogous art, in the same field of endeavor as the ’261 patent, “controlling the use of ‘behind-the-meter’ power” (*id.* at 21–23 (citing Ex. 1001, 1:15–16, 35:11–15, 36:5–36, 37:19–38:17; Ex. 1005, 1–3; Ex. 1006 ¶¶ 2, 19, 37, 106; Ex. 1003 ¶¶ 62–68)); (2) “Kiani focuses on optimizing green energy utilization at distributed datacenters, leaving implementation details for behind-the-meter operation up to a POSITA,” and Pelio “provides behind-the-meter datacenter implementation details, including flexible structural implementations and power delivery teachings” (*id.* at 23–24 (citing Ex. 1005, 2; Ex. 1006 ¶¶ 48–52, 66, 70–71; Ex. 1003 ¶¶ 69–73)); (3) the ordinarily skilled artisan would have had a “reasonable expectation of success” in combining the teachings of Kiani and Pelio because their teachings are “compatible” in that “both teach datacenter placement behind-the-meter to harness green energy before grid transmission and distribution” (*id.* at 24–25 (citing Ex. 1005, 2–4; Ex. 1006 ¶¶ 2, 47, 106; Ex. 1003 ¶¶ 74–75)); (4) combining Kiani’s teachings with Pelio’s “would have been predictable” and within the skillset of the ordinarily skilled artisan as it was “already well-known” in the art to “locate datacenters behind-the-meter to harness unutilized renewable energy” (*id.* at 25–26 (citing Ex. 1012, 1, 4;

Ex. 1013, 5; Ex. 1014, 7; Ex. 1015, 3, 4; Ex. 1016, 1; Ex. 1003 ¶ 76)); and (5) the ordinarily skilled artisan “would have expected Pelio’s flexible datacenter teachings to predictably work with Kiani’s distributed datacenter system teachings, just as has occurred in other known implementations” and the combination would have therefore been nothing more than the combination of known elements (Kiani’s distributed, behind-the-meter datacenters and workload distribution, and Pelio’s behind-the-meter, flexible datacenter implementation details), according to known methods (using Pelio’s flexible datacenter and power distribution teachings for Kiani’s datacenters), to yield predictable results (Kiani’s datacenters having added flexibility while still being behind-the-meter, with power distribution as taught by Pelio) (*id.* at 25–26 (citing Ex. 1005, 2–3; Ex. 1006 ¶¶ 2, 47, 51, 79, 99; Ex. 1003 ¶¶ 77–78)).

We determine, at this stage and on this record, that Petitioner has shown sufficiently, for purposes of institution, that the ordinarily skilled artisan would have been motivated to combine the teachings of Kiani and Pelio.

b. Claim 1

(1) “[1.0] A system comprising”

Petitioner presents evidence that Kiani discloses a system because it discloses green datacenters that integrate renewal energy sources into their operation and receives service requests and distributes those requests to servers at the dispersed datacenters. Pet. 26–27 (citing Ex. 1005, 1–4, Fig. 1).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has

shown sufficiently for institution that the prior art teaches or suggests a system, as recited in claim 1.¹⁰

- (2) “[1.1] a flexible datacenter that is positioned to receive electrical power directly from a power generation system without the received power flowing through a grid comprising” and
“[1.2] a behind-the-meter (“BTM”) power input system configured to receive power from the power generation system prior to the power undergoing step-up transformation for transmission to the grid and provide the received power to the flexible datacenter instead of sending the received power to the grid”

Petitioner presents evidence that Kiani teaches these limitations by disclosing datacenters that are positioned to receive electrical power directly from a power generation system and utilize green energy as much as possible while purchasing brown energy only when necessary to process all incoming workloads. Pet. 27–34 (citing Ex. 1005, 1–4, Fig. 2). Petitioner notes that Kiani discloses its datacenters are within building structures, but contends that this is consistent with the disclosure of the ’261 patent. *Id.* at 29 (citing Ex. 1001, 11:4–17). Petitioner further contends that “it would have been obvious to further implement Kiani’s datacenters within containers for increased operational flexibility, per Pelio.” *Id.* at 30–31 (citing Ex. 1006, Abs., ¶¶ 49, 50, 66, 70–71, 95, 97, Figs. 2, 4).

Petitioner also demonstrates that Kiani’s behind-the-meter green datacenters receive electrical power “directly” from a generator, meaning that it does not flow through a grid before reaching the datacenter. *Id.* at 31–33 (citing Ex. 1005, 2–3, Fig. 2). Petitioner also cites Pelio’s teachings

¹⁰ Petitioner does not take a position on whether the preambles to the claims are limiting. At this stage, for purposes of this Decision, we accept Petitioner’s showing that the preambles are taught or suggested by the prior art, without deciding whether the preambles are limiting.

in further support of this point. *Id.* at 31–34 (citing Ex. 1006 ¶¶ 2, 19, 39, 47, Fig. 2).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of these limitations as recited in claim 1.

(3) “[1.3] a power distribution system”

Petitioner presents evidence that Kiani teaches this limitation by disclosing that servers at each datacenter are “powered by available green energy,” and argues that “[i]t would have been obvious that the servers, being powered by the green power source, would have received that power via a ‘power distribution system.’” Pet. 34 (citing Ex. 1005, 1, 4; Ex. 1003 ¶¶ 109–110). Petitioner also argues that the combination of Kiani with Pelio further would have rendered this limitation obvious because Pelio more explicitly discloses a power distribution system in the form of “raceways” that distribute power to different containers and also in the form of “power feeds” within the containers themselves. *Id.* at 34–36 (citing Pelio ¶¶ 71, 75, 79, 99, Figs. 2, 4). Petitioner cites additional evidence that power feeds such as those taught by Pelio were “well-known” to each include “at least one power distribution unit.” *Id.* at 35–36 (citing Ex. 1020, 1; Ex. 1007 ¶ 82; Ex. 1003 ¶¶ 111–114).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

- (4) “[1.4] a plurality of computing systems powered by the BTM power input system via the power distribution system”

Petitioner presents evidence that Kiani teaches this limitation by disclosing “hundreds of thousands of servers spread across server farms,” noting that “a ‘server farm’ is an exemplary datacenter.” Pet. 36 (citing Ex. 1005, 1; Ex. 1023, 3:18–20; Ex. 1003 ¶¶ 115–116). Petitioner further cites Kiani’s disclosure of sending computational requests to “the back-end servers at geo-dispersed data centers,” asserting that this evidences that Kiani’s servers at each datacenter “are powered by green energy for desired computational requests.” *Id.* (citing Ex. 1005, 4, Fig. 1). Accordingly, Petitioner submits that Kiani alone teaches this limitation because Kiani discloses that “servers at each datacenter are powered by the BTM power via a power distribution system and BTM power input.” *Id.* at 36–37.

Petitioner alternatively argues that Kiani combined with Pelio teaches this limitation because Pelio describes distributing power to containers (housing servers) via “raceways” and “power feeds.” Pet. 34–35 (citing Ex. 1006 ¶ 99, Figs. 2, 4). Thus, argues Petitioner, “Pelio further renders obvious a power distribution system in each datacenter container, such as would be found in Kiani’s datacenters” because Pelio describes that electrical power is “consumed by the servers and data storage units” within a datacenter container, and power is distributed to those servers via “power feeds.” *Id.* at 35–36 (citing Ex. 1006 ¶¶ 71, 75; Ex. 1007 ¶¶ 27, 82; Ex. 1020, 1; Ex. 1003 ¶¶ 111–114); *see also id.* at 37 (providing additional discussion regarding Pelio’s servers).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has

shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

- (5) “[1.5] a queue system configured to organize a plurality of computational operations, wherein the queue system comprises multiple queue subsystems”

Petitioner presents evidence that Kiani teaches this limitation by disclosing “geographical load balancing” to “optimize the utilization of green energy and the cost of electricity” at the datacenters. Pet. 37–38 (citing Ex. 1005, 1–2). Petitioner asserts that, to “accomplish geographical load balancing, datacenters are deployed in various locations (typically farther away from users) with ‘front-end (FE) servers’ closer to users.” *Id.* at 38 (citing Ex. 1005, 2). Then, each FE server “receives requests from its nearby users” and distributes them to back-end servers at geo-dispersed datacenters. *Id.* (citing Ex. 1005, 2, Fig. 1). Each FE server functions “as a workload distribution center” by distributing user requests to the datacenters, and selects the datacenters “based on parameters like server or content availability, network distance, datacenter efficiency, electricity cost, and renewable energy availability.” *Id.* (citing Ex. 1005, 2). Petitioner asserts that “[i]t would have been obvious that the FE server has a queue system to handle receipt of incoming requests and distribution of outbound assignments to Kiani’s datacenters.” *Id.* (citing Ex. 1003 ¶ 124).

Petitioner alternatively asserts that Kiani teaches a queue system by disclosing queues at different datacenters, wherein the “FE server distributes allocated requests to the assigned datacenter, where the requests ‘are first placed in a queue’ before processing by an available server,” and each datacenter has such a queue. *Id.* at 39 (citing Ex. 1005, 5). Petitioner then asserts that “[t]he combined teachings of Kiani and Pelio result in each

flexible datacenter having a queue to receive incoming workload requests from an FE server, as taught by Kiani.” *Id.* at 40 (citing Ex. 1003 ¶¶ 125–127).

With regard to the claim requirement of “multiple queue subsystems,” Petitioner asserts Kiani teaches this requirement by disclosing the queue system has a “queue at each data center” to receive workload allocation from FE servers. Pet. 40 (citing Ex. 1005, 3, 5). In particular, the “allocated requests to a data center are first placed in a queue before they can be processed by any available server” at the datacenter. *Id.* (citing Ex. 1005, 5, Fig. 2). Petitioner notes that this is consistent with the disclosure of the ’261 patent that parts of the queue system are distributed amongst the datacenters. *Id.* at 40–41 (citing Ex. 1001, claims 10, 11).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(6) “[1.6] wherein each queue subsystem organizes a set of computational operations according to rules associated with the queue subsystem”

Petitioner presents evidence that Kiani teaches this limitation by disclosing that each datacenter has rules imposed on the workload allocations to the queue subsystem from the FE server. Pet. 41 (citing Ex. 1005, 3, 5). In particular, Kiani discloses each datacenter has a quality of service (QoS) parameter that is enforced “by maintaining an upper bound” on that datacenter’s queue length. Ex. 1005, 4. Petitioner contends this “upper bound” is a “rule associated with the queue subsystem, and because it impacts the queue itself, the upper bound is a rule that causes the queue to organize the allocated workload (*a set of computational*

operations’) at the datacenter (in the queue) for execution.” Pet. 41 (citing Ex. 1003 ¶¶ 132–133).

Petitioner also contends that Kiani discloses “a plurality of other rules associated with the queue subsystem at each datacenter,” including “[m]aximize green energy utilization for workload,” “[a]pply brown energy if green energy unavailable/insufficient,” “[m]inimize brown energy cost,” and “[m]aintain the QoS for brown energy operations.” *Id.* at 41–42 (citing Ex. 1005, 4; Ex. 1003 ¶ 134). Petitioner also cites to Kiani’s disclosure of each FE server distributing incoming workload based on various distribution-determining parameters, including “the availability of green energy” and “server or content availability, network distance, datacenter efficiency, and/or electricity cost.” *Id.* at 42 (citing Ex. 1004, 2–3).

Petitioner contends that “because the FE server sends a workload allocation to a queue subsystem at a datacenter due to rules dictating that particular allocation as the best option, the organizing is done ‘*according to rules*’ that are ‘*associated with*’ that queue subsystem.” *Id.* (citing Ex. 1003 ¶¶ 136–137). Petitioner further contends that “[t]hese additional rules, alone or in addition to the execution rules at the datacenter itself, also disclose this claim limitation.” *Id.*

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(7) “[1.7] a routing control system configured to”

Petitioner presents evidence that Kiani teaches a routing control system by disclosing an FE server, which manages “the distribution of its

incoming workload to different data centers based on the availability of green energy,” and distributes allocated requests to the assigned datacenter. Pet. 43 (citing Ex. 1005, 3, 5). The additionally claimed details of the routing control system are addressed in the next several sections.

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(8) “[1.8] *[a routing control system configured to] determine, using the queue system, a computational operation to be performed*”

Petitioner presents evidence that Kiani teaches this limitation by disclosing the FE server (which Petitioner maps to the claimed routing control system, as discussed above) receives user requests and distributes them to the geo-dispersed datacenters. Pet. 44 (citing Ex. 1005, 2). Petitioner asserts that the incoming workload (in the form of user requests) to the FE server represents a “computational operation to be performed” as claimed, “because the workload constitutes operation requests from users.” *Id.* (citing Ex. 1005, 2–3). Petitioner further contends that, by knowing what workload the FE server has to distribute, the FE server has “determine[d], using the queue system,” the “computational operation to be performed (and, thus, distributed to a datacenter).” *Id.* (citing Ex. 1003 ¶¶ 142–145).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(9) “[1.9] [a routing control system configured to] determine an amount of BTM power that is available to the plurality of computing systems”

Petitioner presents evidence that Kiani teaches this limitation by disclosing the FE server (which, as discussed above, Petitioner maps to the claimed “routing control system”) determines how much “green energy,” which is behind-the-meter (BTM power), is available to a datacenter, and distributes the workload accordingly. Pet. 44–45 (citing Ex. 1005, 2–3). Petitioner contends that, because “each datacenter has multiple servers (‘*computing systems*’), of which at least several are powered by ‘green energy’ (BTM), [t]he FE server’s determination of the amount of green energy available to a datacenter teaches a determination of BTM power available to the computing systems at the datacenter.” *Id.* at 45. Petitioner notes, in particular, Kiani’s teaching that “green workload is defined as ‘the workload served by a green server’ in a datacenter, with ‘some servers [] turned on and powered by the available green energy (green servers).’” *Id.* at 45–46 (alteration in original) (citing Ex. 1005, 4; Ex. 1003 ¶ 149).

Petitioner additionally argues that this limitation “is further rendered obvious combined with Pelio’s teaching of receiving power BTM by a co-located datacenter,” and “[i]n combination, Kiani’s FE server takes into account the BTM power available according to both Kiani’s and Pelio’s BTM teachings.” *Id.* at 46 (citing Ex. 1003 ¶¶ 151–152).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(10) “[1.10] [a routing control system configured to:] determine whether to route the computational operation to the flexible datacenter using the amount of BTM power that is available”

Petitioner presents evidence that Kiani teaches this limitation by disclosing FE servers that distribute workload to datacenters based on their respective “availability of green energy,” which Kiani teaches is provided “behind the meter.” Pet. 46 (citing Ex. 1005, 3). Petitioner contends that the “availability of green energy” determination, together with Kiani’s “behind the meter” teaching for that green energy, teaches determining whether to route the computational operation to a datacenter using the amount of BTM power that is available, as claimed. *Id.* at 46–47. Petitioner also notes that, in an example provided in Kiani, the available wind power “is the key decision factor to allocate workloads among the data centers.” *Id.* at 47 (citing Ex. 1005, 4). Petitioner additionally argues that Kiani’s disclosures combined with Pelio’s disclosure of flexible datacenters further render this limitation obvious. *Id.* (citing Ex. 1005, 2–3; Ex. 1006, Abs., ¶¶ 49, 71, Fig. 2; Ex. 1003 ¶¶ 156–158).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(11) “[1.11] [a routing control system configured to:] based on a determination to route the computational operation to the flexible datacenter, assign the computational operation for performance at the flexible datacenter”

Petitioner presents evidence that Kiani teaches this limitation by disclosing that each FE server allocates workload to a determined datacenter (“a flexible datacenter, per Pelio’s teachings”), “by distributing user requests

to the appropriate data centers.” Pet. 47–48 (citing Ex. 1005, 2; Ex. 1003 ¶¶ 159–160). In particular, Petitioner contends that “Kiani’s workload allocation discloses ‘*assign[ing] the computational operation,*’ since Kiani’s distribution of the workload (an example of computational operations) to a determined datacenter is an act of assigning for performance at the datacenter.” *Id.* at 48 (citing Ex. 1005, 2; Ex. 1003 ¶ 161). Petitioner notes that Kiani teaches, using wind power as an example, “assigning workload to datacenters based on availability of the BTM wind power.” *Id.* (citing Ex. 1005, 4, Figs. 3, 4). Petitioner contends “Kiani’s distribution/allocation of workload is expressly an act of ‘assign[ing]’ to a given datacenter . . . and Kiani’s allocation of the workload is based on determining to route the workload based on the amount of BTM green energy at the datacenter.” *Id.* at 50 (citing Ex. 1005, 2–4; Ex. 1006, Abs., ¶¶ 49, 71; Ex. 1003 ¶¶ 162–167).

We have reviewed the arguments and evidence submitted by Petitioner. At this stage, and on this record, we determine that Petitioner has shown sufficiently for institution that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(12) Claim 1: Conclusion

We find, on the present record, Petitioner has presented arguments and evidence sufficient for institution that the combination of Kiani and Pelio teaches or suggests all elements of claim 1. We also find Petitioner has shown sufficiently for institution that the ordinarily skilled artisan would have been motivated to combine the teachings of these references with a reasonable expectation of success.

For the foregoing reasons, based on the current record, we determine Petitioner has established a reasonable likelihood of prevailing in showing that claim 1 is unpatentable over the combination of Kiani and Pelio.

c. Claims 2 and 9–12

Petitioner also presents evidence and argument supporting its contentions that claims 2 and 9–12, which depend directly or indirectly from claim 1, would have been obvious over the combined teachings of Kiani and Pelio. Pet. 50–53.

In particular, Petitioner presents evidence that the combination of Kiani and Pelio teaches the subject matter of (1) claim 2 (*id.* at 50–51 (referring to showing for claim 1 and also citing Ex. 1005, 2–3, Fig. 1; Ex. 1006, Abs., ¶¶ 49, 71, Fig. 2; Ex. 1003 ¶¶ 168–171)); (2) claim 9 (*id.* at 51 (referring to showing for claim 1 and also citing Ex. 1005, 2; Ex. 1003 ¶¶ 174–177)); (3) claim 10 (*id.* at 51–52 (referring to showing for claim 1 and also citing Ex. 1005, 2–3, 5, Fig. 2; Ex. 1006 Abstract, ¶¶ 49, 71; Ex. 1003 ¶¶ 178–182)); (4) claim 11 (*id.* at 52–53 (referring to showing for claim 1 and also citing Ex. 1005, 5, Fig. 2; Ex. 1006 ¶ 49; Ex. 1003 ¶¶ 183–187)); and (5) claim 12 (*id.* at 53 (referring to showing for claim 1 and also citing Ex. 1005, 5; 1006 ¶ 49; Ex. 1003 ¶¶ 188–191)).

As this stage of the proceeding, Patent Owner has not submitted a preliminary response and, therefore, does not challenge Petitioner's arguments or evidence as to these claims.

We have reviewed Petitioner's evidence and arguments and we determine, at this stage and on this record, that they are sufficient to show a reasonable likelihood that claims 2 and 9–12 would have been obvious over the combination of Kiani and Pelio.

2. *Additional Grounds*

Petitioner additionally challenges several claims as obvious over the same primary combination (Kiani and Pelio) in further combination with at least one of Chapel, Belady, and Forestiero. Pet. 53–91. In particular, Petitioner challenges claims 4–8 as obvious over the combination of Kiani, Pelio, and Chapel (*id.* at 53–69); claim 3 over the combination of Kiani, Pelio, and Belady (*id.* at 69–75); and claims 13–16 over the combination of Kiani, Pelio, Chapel, and Forestiero (*id.* at 76–91).

At this stage of the proceeding, it is not necessary for us to provide a detailed assessment of the additional grounds. A decision to institute under 35 U.S.C. § 314 may not institute review on fewer than all claims challenged in a petition. *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 364–65 (2018). Moreover, when we institute a trial, we must institute on all challenges raised in the petition. *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (noting that a decision to institute is “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”). In light of our determination that Petitioner has met its burden under 35 U.S.C. § 314(a) as to its challenge as to claims 1, 2, and 9–12 over the combination of Kiani and Pelio, we also determine that it is appropriate to institute *inter partes* review based on Petitioner’s other asserted grounds.

III. CONCLUSION

For the foregoing reasons, we determine Petitioner has established a reasonable likelihood of prevailing in showing that one or more claims are unpatentable over the cited prior art.

IV. ORDER

For the reasons given, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is *instituted* on all challenged claims with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '261 patent is instituted commencing on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the institution of a trial.

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