

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*.

JUDGMENT
Final Written Decision
Determining All Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

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.

We instituted trial on April 7, 2025. Paper 7 (“Dec.” or “Institution Decision”). Patent Owner did not file a Patent Owner Response; accordingly, no further briefing has been filed since institution. Petitioner passed on oral argument. Paper 10. Our decision herein is based on the Petition and accompanying evidence.

We have jurisdiction under 35 U.S.C. § 6 and issue this decision under 35 U.S.C. § 318(a). After considering the evidence and arguments presented, and for the reasons set forth below, we determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 1–16 are unpatentable.

II. BACKGROUND

A. Real Parties in Interest

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

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

B. 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.

C. 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.

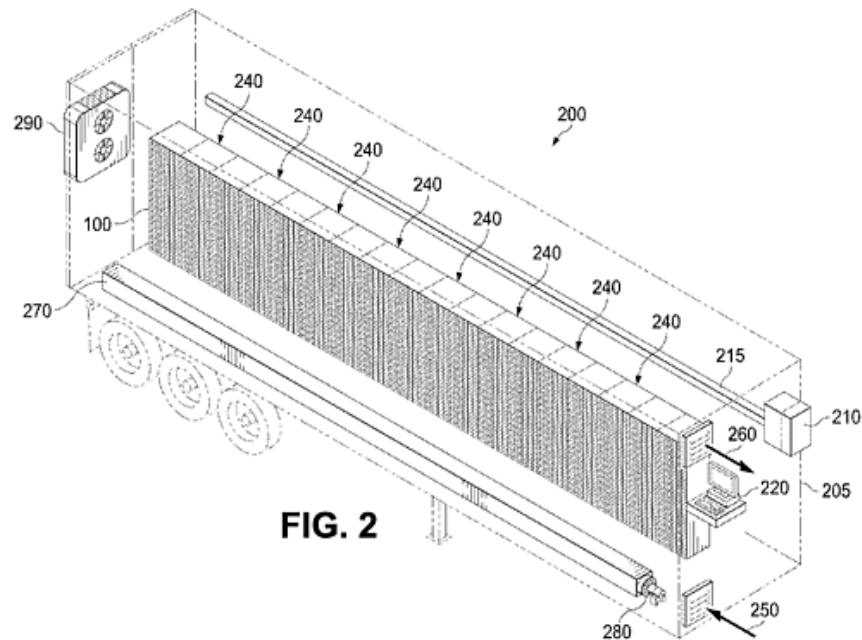


Figure 2 is a diagram depicting “a flexible datacenter” that “may use behind-the-meter power in order to provide processing abilities and other computing resources.” Ex. 1001, 6:48–50.

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

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

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.

D. Illustrative Claims

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, directly or indirectly, from claim 13. Claims 1 and 13, reproduced below (with bracketed numbering as added by Petitioner), illustrate the claimed subject matter:

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; Pet. 94–95.

13. [13.0] A flexible datacenter comprising:

- [13.1] a behind-the-meter (“BTM”) power input system configured to receive power from a power generation system prior to the power undergoing step-up transformation for transmission to a grid and provide the received power to the flexible datacenter instead of sending the received power to the grid;
- [13.2] a power distribution system;
- [13.3] a datacenter control system;

[13.4] a plurality of computing systems, wherein the plurality of computing systems are powered by the BTM power input system via the power distribution system; and

[13.5] a queue subsystem configured to organize a set of computational operations for performance by the plurality of computing systems, wherein the queue subsystem is part of a distributed queue system;

[13.6] wherein the datacenter control system is configured to:

determine, using the queue system, a computational operation to be performed;

[13.7] determine an amount of BTM power that is available to the plurality of computing systems;

[13.8] determine whether to route the computational operation to the flexible datacenter using the amount of BTM power that is available; and

[13.9] 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, 37:19–38:16; Pet.97–98.

E. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–16 are unpatentable on the following grounds, for which we instituted trial (Pet. 16; Dec. 7, 31):

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”).

F. Prior Art

We provide brief summaries of the asserted 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.

We evaluated the evidence submitted by Petitioner at the institution stage and determined that Petitioner had shown sufficiently for purposes of institution that Kiani qualifies as a printed publication. *See* Dec. 10–12 (citing *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 19 (PTAB Dec. 20, 2019) (precedential)). Patent Owner has not challenged Petitioner’s showing or our initial determination.

We determine that, based on the full and unchallenged record of the proceeding, 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,”⁸ 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.*

⁸ 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.

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 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 uses flexible, just-in-time, modular datacenter 200, as shown in Figure 2 reproduced below. *Id.* ¶ 48.

Fig. 2

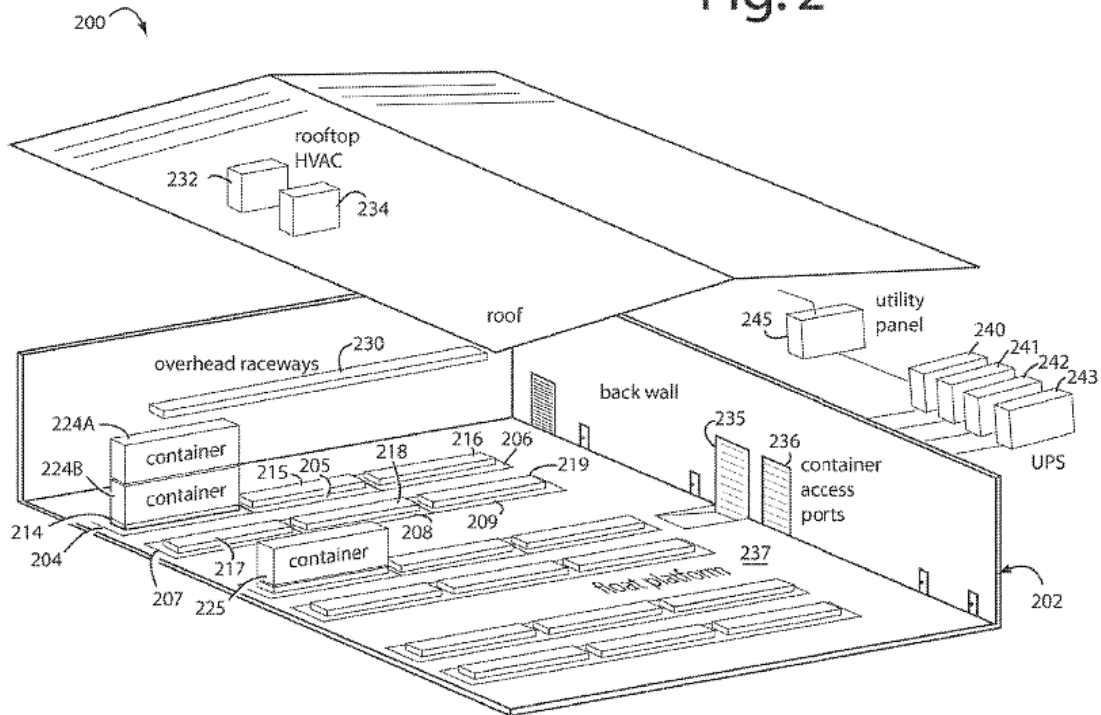


Figure 2 from Pelio depicts a flexible, just-in-time, modular datacenter showing containers placed on various designated floor spaces and supported by a modular infrastructure. Ex. 1005 ¶ 24.

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.*

We evaluated the evidence submitted by Petitioner at the institution stage and determined that Petitioner had shown sufficiently for purposes of institution that Forestiero qualifies as a printed publication. *See* Dec. 15–16 (citing *Hulu*, IPR2018-01039, Paper 29 at 19). Patent Owner has not responded to Petitioner’s showing or our initial determination.

We determine that, based on the full and unchallenged record of the proceeding, 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.*

III. 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.⁹ *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).

We organize our patentability analysis into three sections. First, we address the level of ordinary skill in the art. Second, we address claim construction. And third, taking account of the arguments and evidence presented, we consider whether Petitioner has met its burden of proving by a preponderance of the evidence that the challenged claims are unpatentable.

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)).

⁹ We have no evidence of secondary considerations before us.

In our Institution Decision, we adopted Petitioner’s articulation of the level of ordinary skill in the art as someone that “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.” Dec. 9 (citing Pet. 15; Ex. 1003 ¶¶ 20–22).

Patent Owner has not filed a Patent Owner Response, and therefore Petitioner’s assessment and our initial determination remain unchallenged.

We maintain our determination of the level of ordinary skill in the art as stated in our Institution Decision, and we apply it herein. 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 Patent Owner Response, and hence also does not propose any terms for construction.

We determine that no claim term requires express interpretation. *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. Alleged Unpatentability

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 challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1, 2, and 9–12 are unpatentable on this ground.

a. Motivation To Combine Kiani and Pelio

As a precursor to its obviousness analysis, Petitioner provides evidence and 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 shows: (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 agree the cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests a system, as recited in claim 1.¹⁰

¹⁰ Petitioner does not take a position on whether the preambles to the claims are limiting. We accept Petitioner’s showing that the preambles are taught or suggested by the prior art, without deciding whether the preambles are limiting.

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

We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 shows 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 shows 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 shows 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. We agree Petitioner’s cited evidence supports Petitioner’s contentions.

Petitioner alternatively shows 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner's showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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). We agree Petitioner's cited evidence supports Petitioner's contentions.

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 agree Petitioner’s cited evidence supports Petitioner’s contentions. As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

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).

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence 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 agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of this limitation as recited in claim 1.

(12) Claim 1: Conclusion

We find Petitioner has demonstrated by a preponderance of the evidence that the combination of Kiani and Pelio teaches or suggests all elements of claim 1. We also find Petitioner has demonstrated by a preponderance 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 full trial record, we determine Petitioner has demonstrated by a preponderance that claim 1 is unpatentable over the combination of Kiani and Pelio.

c. Claim 2

Claim 2 depends from claim 1 and recites “wherein the routing control system is a remote master control system positioned remotely from the flexible datacenter.” Ex. 1001, 36:37–39.

Petitioner presents evidence that Kiani teaches the subject matter of claim 2. Pet. 50–51. In particular, Petitioner shows that Kiani teaches locating the front end (“FE”) server (which Petitioner maps to the claimed “routing control system”) close to users, and thus “remotely from the datacenters that are typically farther away from those same users.” *Id.* at 50 (citing Ex. 1005, 2–3, Fig. 1; Ex. 1003 ¶¶ 168–171). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 2.

d. Claim 9

Claim 9 depends from claim 1 and recites “wherein the routing system controls distribution of the plurality of computational operations from the queue system.” Ex. 1001, 37:9–11.

Petitioner presents evidence that Kiani teaches the subject matter of claim 9 by disclosing “a routing control system that distributes user requests to determined datacenters’ queues.” Pet. 51 (citing Ex. 1005, 2). Petitioner

contends this “demonstrates that the FE server, a part of the ‘*queue system*,’ controls distribution of computational operations from the FE server.” *Id.* (citing Ex. 1003 ¶¶ 174–177). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 9.

e. Claim 10

Claim 10 depends from claim 1 and recites “wherein a first queue subsystem of the queue system is located at the flexible datacenter.” Ex. 1001, 37:12–14.

Petitioner presents evidence that Kiani teaches the subject matter of claim 10. Pet. 51–52. Petitioner shows that Kiani discloses a queue at each datacenter by disclosing that “[w]hen a FE server allocates requests (workload), they are ‘placed in a queue’ at the assigned datacenter.” *Id.* at 51 (citing Ex. 1005, 2–3, 5, Fig. 2; Ex. 1003 ¶¶ 178–180). Petitioner also contends that the combined teachings of Kiani and Pelio “render obvious a flexible datacenter placed BTM.” *Id.* at 52 (citing evidence for claim 1; Ex. 1005, 2–3; Ex. 1006 Abstract, ¶¶ 49, 71; Ex. 1003 ¶¶ 178–182). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 10.

f. Claim 11

Claim 11 depends from claim 10, and recites “a second datacenter, wherein a second queue subsystem of the queue system is located at the second datacenter.” Ex. 1001, 37:15–16.

Petitioner presents evidence that Kiani teaches the subject matter of claim 11. Pet. 52–53. In particular, Petitioner shows that Kiani discloses multiple datacenters, with a “queue at each data center” for workload requests. *Id.* at 52 (citing Ex. 1005, 5, Fig. 2; Ex. 1003 ¶¶ 183–187). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 11.

g. Claim 12

Claim 12 depends from claim 11 and recites “wherein the second datacenter is a second flexible datacenter.” Ex. 1001, 37:17–18.

Petitioner presents evidence that the combination of Kiani and Pelio teaches the subject matter of claim 12. Pet. 53. As noted for claim 11, Petitioner shows that Kiani discloses multiple datacenters each having a queue. *Id.* at 52 (citing Ex. 1005, 5, Fig. 2). Petitioner further shows that the combination of Kiani and Pelio teaches that such datacenters are flexible

datacenters. *Id.* at 53 (citing Ex. 1005, 5; 1006 ¶ 49; Ex. 1003 ¶¶ 188–191). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 12.

h. Ground 1: Conclusion

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, and 9–12, challenged in Ground 1, are unpatentable over the combination of Kiani and Pelio.

2. Ground 2: Obviousness of claims 4–8 over Kiani, Pelio, and Chapel

Petitioner challenges claims 4–8 as obvious over the combination of Kiani, Pelio, and Chapel. Pet. 53–69.

a. Motivation To Combine Chapel with Kiani and Pelio

As a precursor to its obviousness analysis, Petitioner provides evidence and articulates reasons why the ordinarily skilled artisan would have combined the teachings of Chapel with Kiani and Pelio in the manner proposed by Petitioner. Pet. 54–58. Petitioner shows: (1) Chapel’s teachings are “reasonably pertinent to problems identified in the ’261 patent” because Chapel describes approaches for controlling power delivery so as to modulate power delivery “over a single circuit or an entire datacenter” “in response to power supply changes” (*id.* at 54–55 (citing Ex. 1007 ¶¶ 2, 19 47, 48, 56, 79, 90; Ex. 1003 ¶¶ 196–198)); (2) Pelio teaches distributing BTM power to datacenter containers and to servers within the containers, but “leaves the details to POSITAs,” and the ordinarily skilled artisan would have been “motivated to turn to Chapel for

additional power distribution system implementation and control details” because power distribution units “were well-known in datacenter design” (*id.* at 55 (citing Ex. 1006, Abs.; Ex. 1012, 1, 4; Ex. 1014, 7; Ex. 1013, 6; Ex. 1015, 3,4; Ex. 1003 ¶¶ 199–200)); (3) Kiani and Pelio teach placing datacenters behind-the-meter to harness power, leaving details regarding handling power source variability up to the ordinarily skilled artisan, and “Chapel teaches monitoring and controlling delivery of electricity to servers within the datacenter based on the available power supply” (*id.* at 55–56 (citing Ex. 1005, 2–3; Ex. 1006 ¶¶ 2, 37, 70, 106; Ex. 1007 ¶¶ 2, 47, 80–83, 90; Ex. 1003 ¶¶ 201–203)); and (4) the ordinarily skilled artisan would have had a reasonable expectation of success in combining the teachings of Chapel with Kiani and Pelio because the teachings are all compatible, and the combination would have been “predictable” and within the skill of the ordinarily skilled artisan (*id.* at 56–58 (citing Ex. 1005, 3; Ex. 1006, Abs., ¶¶ 2, 33, 37, 50, 106; Ex. 1007 ¶¶ 2, 47, 80–83; Ex. 1012, 1, 4; Ex. 1014, 7; Ex. 1015, 3, 4; Ex. 1016, 1; Ex. 1003 ¶¶ 204–208)).

b. Claim 4

Claim 4 depends from claim 1, and recites “wherein the flexible datacenter further comprises: a datacenter control system, wherein the datacenter control system is configured to modulate power delivery to the plurality of computing systems based on one or more monitored power system conditions.” Ex. 1001, 36:43–48.

Petitioner presents evidence that the combination of Kiani, Pelio, and Chapel teaches the subject matter of claim 4. Pet. 58–64. Citing evidence presented for claim 1, Petitioner shows that the combined teachings of Kiani and Pelio render obvious “a power delivery system that delivers power to the

plurality of computing systems.” *Id.* at 58. Petitioner also shows that both Kiani and Pelio “teach placing datacenters near a power generating source behind-the-meter so a higher percentage of the produced power actually reaches the datacenter load,” noting that both Kiani and Pelio teach taking some action to account for variability of power derived from green energy. *Id.* at 58–60 (citing Ex. 1005, 2–3; Ex. 1006 ¶¶ 2, 19, 37, 43, 105–106; Ex. 1003 ¶¶ 213–215). Petitioner contends that “Kiani and Pelio both leave details up to a POSITA for how to control power at a datacenter due to varying green power availability,” and shows that the ordinarily skilled artisan “would have been motivated to turn to Chapel, which teaches ways to control power within a datacenter to address actual or potential power shortfalls, such as those arising from variable sources of power like solar, wind, etc.” *Id.* at 60 (citing Ex. 1003 ¶ 216). Petitioner also presents evidence that Chapel teaches how to control power within a datacenter for conditions when available power falls below the power demand of a datacenter, such as by “modulating power delivery to one or more of the servers.” *Id.* (citing Ex. 1007 ¶ 48; Ex. 1003 ¶ 217). Petitioner shows that Chapel teaches “electrical power distribution and management,” which includes “intelligently monitor[ing] at least a portion of the circuit and control[ling] delivery . . . over the circuit,” and also teaches “remote monitoring and/or control of multiple receptacles” providing power to servers, including modulating power delivery based on monitored conditions of the power system. *Id.* at 60–63 (citing Ex. 1007 ¶¶ 19, 47, 56, 80–82, 89, 90, Figs. 3, 6; Ex. 1003 ¶¶ 218–226). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 4.

c. Claim 5

Claim 5 depends from claim 4, and recites “wherein the one or more monitored power system conditions comprises: behind-the-meter (“BTM”) power availability at the plurality of computing systems.” Ex. 1001, 36:49–51.

Petitioner presents evidence that the combination of Kiani, Pelio, and Chapel teaches the subject matter of claim 5. Pet. 64. First, citing evidence presented for claim 4, Petitioner contends the combination of Kiani, Pelio, and Chapel teaches “one or more monitored power system conditions.” *Id.* (emphasis omitted). Petitioner then shows Kiani teaches that the availability of BTM power at the datacenter—and, thus, at the datacenter’s “back-end servers”—is “a monitored power system condition.” *Id.* (citing Ex. 1005, 3 (“based on the availability of green energy”), 2 (“back-end servers”)).

Petitioner contends that

[t]o know how much workload to allocate as green workload (per Kiani), and/or whether to throttle up/down another power source (per Kiani and Pelio) or the level of load, a POSITA would recognize that the current status of green energy availability BTM at the datacenter (and, thus, to servers in the datacenter) would need to be monitored. . . . The combination with Chapel renders obvious such monitoring of Kiani’s BTM green energy availability.

Id. (citing Ex. 1007 ¶¶ 4, 47, 82; Ex. 1003 ¶¶ 230–32). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner's showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 5.

d. Claim 6

Claim 6 depends from claim 4, and recites:

wherein the one or more monitored power system conditions comprises:

one or more of excess local power generation at a local station level, excess local power generation that a grid cannot receive, local power generation subject to economic curtailment, local power generation subject to reliability curtailment, local power generation subject to power factor correction, low local power generation, start up local power generation situations, transient local power generation situations, or testing local power generation situations where there is an economic advantage to using local behind-the-meter power generation.

Ex. 1001, 36:53–65.

Petitioner presents evidence that Kiani, alone or further combined with Pelio, teaches the subject matter of claim 6. Pet. 64–67. Petitioner first presents evidence that Kiani teaches situations in which “BTM co-located power sources would generate excess power or not enough power,” such as power sources derived from “green energy.” *Id.* at 65 (citing Ex. 1005, 3–4). Petitioner also presents evidence that Pelio “also recognizes the well-known fact that some types of renewable power generating stations, such as solar and wind, ‘cycle between full operation and zero.’” *Id.* at 65–66 (citing Ex. 1006 ¶¶ 37, 44–46). Thus, both Kiani and Pelio teach situations in which local power generation is in “excess” as well as “low.” *Id.*

Petitioner also presents evidence that both Kiani and Pelio teach renewable power generation is “transient” because “green energy is not a constantly available resource to power.” *Id.* at 66–67 (citing Ex. 1005, 3; Ex. 1006 ¶¶ 37, 106; Ex. 1003 ¶¶ 241–243). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 6.

e. Claim 7

Claim 7 depends from claim 1, and recites: “wherein the flexible datacenter further comprises: a datacenter control system, wherein the datacenter control system is configured to modulate power delivery to the plurality of computing systems based on an operational directive.” Ex. 1001, 36:66–37:4.

Petitioner presents evidence that the combination of Kiani, Pelio, and Chapel teaches the subject matter of claim 7. Pet. 67–68. First, citing evidence presented for claim 4, Petitioner contends the combination of Kiani, Pelio, and Chapel teaches a “datacenter control system . . . configured to modulate power delivery to the plurality of computing systems.” *Id.* (emphasis omitted). Petitioner then shows the combination of Kiani, Pelio, and Chapel teaches or suggests the datacenter control system modulating power delivery “based on an operational directive.” *Id.* (emphasis omitted). In particular, Petitioner shows Chapel teaches the local controller (which Petitioner maps to the claimed “datacenter control system”) modulating

power delivery by policies, such as “a message from the electrical utility provider specifying transition to an efficiency mode or a brownout mode.”

Id. (citing Ex. 1007 ¶¶ 58, 66, 76, 90; Ex. 1003 ¶¶ 247–248). Petitioner contends the ordinarily skilled artisan

would have understood that Kiani-Pelio’s flexible datacenters co-located BTM with a generation station would have times when there would be a reduction in power output (e.g., solar or wind conditions changing), causing an overload condition unless power is received from the grid or load is reduced. A POSITA would have thus implemented Chapel’s teachings for reducing power delivery to one or more datacenter servers to reduce load and avoid an overload condition.

Id. at 68 (citing Ex. 1003 ¶¶ 249–250). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 7.

f. Claim 8

Claim 8 depends from claim 7 and recites “wherein the operational directive originates from the routing control system and depends on behind-the-meter (‘BTM’) power availability at the plurality of computing systems.” Ex. 1001, 37:5–8.

Petitioner presents evidence that the combination of Kiani, Pelio, and Chapel teaches the subject matter of claim 8. Pet. 68–69. Citing evidence presented for claim 7, Petitioner contends the combination of Kiani, Pelio, and Chapel teaches modulating power delivery based on an “operational directive.” *Id.* at 68. Petitioner then presents evidence that the combination

teaches monitoring BTM power availability within Kiani’s datacenters (which, per Pelio’s teachings, are flexible datacenters). *Id.* (citing Ex. 1005, 2; Ex. 1006, Abs., ¶¶ 49, 71, Fig. 2; Ex. 1007 ¶¶ 4, 7, 47, 56, 82–83). Thus, the combination “teaches Kiani’s FE server monitoring BTM power availability according to Chapel’s teachings, and providing a message to locally control a flexible datacenter depending on the amount of BTM power available to the server.” *Id.* at 68–69 (citing Ex. 1003 ¶¶ 254–256). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 8.

g. Ground 2: Conclusion

We find Petitioner has demonstrated by a preponderance of the evidence that the combination of Kiani, Pelio, and Chapel teaches or suggests all elements of claims 4–8. We also find Petitioner has demonstrated by a preponderance 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, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 4–8, challenged in Ground 2, are unpatentable over the combination of Kiani, Pelio, and Chapel.

3. *Ground 3: Obviousness of claim 3 over Kiani, Pelio, and Belady*

Claim 3 depends from claim 1, and recites “wherein the routing control system is a remote master control system positioned at the flexible datacenter.” Ex. 1001, 36:40–42.

Petitioner challenges claim 3 as obvious over the combination of Kiani, Pelio, and Belady. Pet. 69–75.

As a precursor to its obviousness analysis, Petitioner articulates reasons why the ordinarily skilled artisan would have combined the teachings of Belady with those of Kiani and Pelio in the manner proposed by Petitioner, such that, in combination, “Kiani’s datacenters would implement Belady’s real-time monitoring and computational task movement teachings by a control system (e.g., Kiani’s FE server, and Belady’s management system teachings).” Pet. 73. Petitioner contends: (1) Belady is, like Kiani and Pelio, analogous art, in the same field of endeavor as the ’261 patent, “controlling the use of BTM power” (*id.* at 70 (citing Ex. 1008, 2:6–14, 6:53–7:17; Ex. 1003 ¶¶ 262–263)); (2) the ordinarily skilled artisan would have found Belady’s teachings to be reasonably pertinent because “Belady teaches co-locating datacenters with renewable power sources to reduce infrastructure costs and transmission losses” (*id.* at 70–71 (citing Ex. 1008, 7:1–9; Ex. 1003 ¶ 264)); (3) Kiani’s placement of FE server control functionality was “a mere design choice,” and the ordinarily skilled artisan would have “been motivated to turn from Kiani to Belady for the teachings about implementing management functionality . . . on top of the datacenter software at a datacenter itself” (*id.* at 71 (citing Ex. 1008, 8:15–31; Ex. 1003 ¶ 265)); (4) the ordinarily skilled artisan also would have been motivated to turn from Kiani and Pelio for Belady’s teachings “of moving computational

tasks due to power availability, and how to detect and determine that it is appropriate to move” (*id.* at 72 (citing Ex. 1008, 2:15–22, 10:14–34; Ex. 1003 ¶ 266)); and (5) the ordinarily skilled artisan would have had a reasonable expectation of success applying Belady’s teachings to the Kiani-Pelio teachings, because “all recognize the utility of moving computing jobs/tasks between data centers for cost advantage (Kiani) and/or in response to power availability issues (Pelio, Belady)” (*id.* at 73 (citing Ex. 1008, 2:14–22, 6:53–7:17; Ex. 1005, 2–3; Ex. 1006 ¶¶ 2, 106; Ex. 1003 ¶ 268)).

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the ordinarily skilled artisan would have been motivated to combine the teachings of Belady with those of Kiani and Pelio.

Turning to the Petitioner’s arguments regarding the combined teachings, Petitioner contends (citing evidence and arguments submitted for claims 1 and 2) that Kiani teaches the “routing system is a remote master control system,” and Kiani and Pelio teach the “flexible data center.” Pet. 74. Petitioner then contends that the placement of the control system (e.g., Kiani’s FE server) “is a mere design choice, with options including remote placement from the datacenter, at the datacenter, or split between remote and local systems.” *Id.* Petitioner then demonstrates how Belady teaches placing the control system at the datacenter, and how the ordinarily skilled artisan would have been motivated, in light of the flexible nature of the Kiani-Pelio datacenters, to implement an FE server at the datacenter itself per Belady’s teachings. *Id.* at 74–75 (citing Ex. 1008, 2:14–22,

8:15–20, 8:23–26, 12:20–30; Ex. 1005, 2; Ex. 1006 ¶¶ 55–60; Ex. 1003 ¶¶ 275–279). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 3.

4. Ground 4: Obviousness of claims 13–16 over Kiani, Pelio, Chapel, and Forestiero

a. Motivation To Combine Forestiero with Kiani, Pelio, and Chapel

As a precursor to its obviousness analysis, Petitioner provides evidence and articulates reasons why the ordinarily skilled artisan would have combined the teachings of Forestiero with Kiani, Pelio, and Chapel in the manner proposed by Petitioner. Pet. 77–81. Petitioner shows: (1) Forestiero’s teachings are “reasonably pertinent” to the problems faced by the inventors of the ’261 patent because Forestiero’s teachings “enable datacenters to manage their workload for better performance and cost,” thus aligning with the stated goals of the ’261 patent to address workload management and reduce cost of datacenter use (*id.* at 77 (citing Ex. 1001, 6:14–17; Ex. 1003 ¶¶ 287–288)); (2) the ordinarily skilled artisan would have been “motivated to turn to Forestiero’s geo-distributed workload management teachings to harness Forestiero’s benefits of decentralized workload management,” which would work with Kiani’s geographical load balancing teachings to “result in FE servers reducing their decision-making burden” (*id.* at 78–79 (citing Ex. 1009, 3–4; Ex. 1005, 2; Ex. 1003 ¶¶ 289–291)); and (3) the ordinarily skilled artisan would have had a

reasonable expectation of success combining Forestiero with Kiani because “Forestiero’s distribution of the workload distribution decision to a controller at each datacenter (e.g., in a collective decision-making process with the other datacenter controllers) is nothing more than a natural extension of Kiani’s recognition of the benefits of distributing decision-making” (*id.* at 79–81 (citing Ex. 1005, 2; Ex. 1009, 3–4; Ex. 1001 ¶¶ 292–297)). We agree the cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the ordinarily skilled artisan would have been motivated to combine the teachings of Forestiero with Kiani, Pelio, and Chapel.

b. Claim 13

Petitioner challenges claim 13 as obvious over the combination of Kiani, Pelio, Chapel, and Forestiero. Pet. 82–88.

(1) Limitations [13.0]–[13.4]

For limitations labeled by Petitioner as [13.0]–[13.4], which are substantively the same as limitations recited in claim 1, Petitioner refers to its showing for limitations labeled by Petitioner as [1.1], [1.2], [1.4], [1.7], and [1.4], respectively. Pet. 82. As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

We agree with Petitioner’s mapping and incorporate our determinations for those limitations (*see supra* III.D.1.b, 2.b) to conclude

that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of limitations [13.0]–[13.4].

(2) “[13.5] *a queue subsystem configured to organize a set of computational operations for performance by the plurality of computing systems, wherein the queue subsystem is part of a distributed queue system*”

Petitioner presents evidence that Kiani teaches this limitation by disclosing a queue subsystem at each datacenter that receives workload assignments from an FE server. Pet. 82 (citing Ex. 1005, 5; Ex. 1003 ¶¶ 209–305). Petitioner shows that the queue at each datacenter is part of a distributed queue system, and each datacenter’s queue “organizes computational operations at that datacenter for execution (*‘performance’*) by servers at that datacenter.” *Id.* (citing evidence presented for limitations [1.5] and [1.6] of claim 1; Ex. 1005, 3–5; Ex. 1003 ¶¶ 307–308). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of this limitation as recited in claim 13.

(3) “[13.6] *wherein the datacenter control system is configured to: determine, using the queue system, a computational operation to be performed*”

Petitioner presents evidence that Kiani combined with Chapel and Forestiero teaches this limitation. Pet. 83–84. In particular, Petitioner shows that Kiani discloses a control system that determines, using the queue system, a computational operation to be performed because Kiani’s FE

server “receives user requests and distributes the requests to servers at geo-dispersed datacenters.” *Id.* at 83 (citing Ex. 1005, 2–3). Petitioner also shows that “[b]ecause the FE server knows about the workload to distribute, the FE server has ‘*determine[d], using the queue system,*’ the computational operation to be performed after distribution to a datacenter.” *Id.* (citing Ex. 1003 ¶¶ 309–310). Petition then shows Chapel’s local controller “controls power distribution and management within a datacenter” (thus satisfying the “datacenter control system” limitation). *Id.* at 83–84 (citing Ex. 1007 ¶ 2 and Fig. 2). Petitioner contends that “[w]ith a local controller at each datacenter” as taught by the combined teachings of Kiani and Chapel, the ordinarily skilled artisan would have known to “implement workflow allocation control to the datacenters’ local controllers.” *Id.* at 84 (citing Ex. 1003 ¶¶ 311–313).

Petitioner then turns to Forestiero as teaching “decentraliz[ing] allocation of workloads . . . in geo-distributed datacenter systems” by using a datacenter manager (DCM) at each datacenter, which “makes decisions about the distribution of workload among the datacenters” based on “information received locally and from other datacenter cites.” Pet. 84–86 (citing Ex. 1009, 1, 2, 4, Figs. 1, 2). Petitioner shows that “it would have been obvious for Kiani’s geographically distributed datacenters to include DCM functionality within a local controller (as taught by Chapel).” *Id.* at 86 (citing Ex. 1009, 3; Ex. 1003 ¶¶ 314–317). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of this limitation as recited in claim 13.

(4) “[13.7] *determine an amount of BTM power that is available to the plurality of computing systems*”

Petitioner presents evidence that Kiani combined with Pelio teaches this limitation by disclosing “a control system configured to determine an amount of BTM power that is available to the plurality of computing systems, via the FE server (a ‘*routing control system*’).” Pet. 87 (citing Ex. 1005, 2–3; Ex. 1003 ¶¶ 320–321). Petitioner then shows that “it would have been obvious to implement the control in a decentralized manner by a datacenter control system (e.g., Chapel’s local controller), according to Forestiero’s decentralized DCM teachings,” wherein “Kiani’s FE server would field user requests and distribute those requests according to the determination by Forestiero’s DCMs (datacenter control systems, e.g. Chapel’s local controllers).” *Id.* (citing Ex. 1009, 2; Ex. 1003 ¶ 322). Petitioner also posits that “the information collected by Forestiero’s DCMs about datacenter conditions would include the availability of ‘green energy’ per Kiani’s teachings, and thus BTM power as taught by both Kiani and Pelio.” *Id.* at 87–88 (citing Ex. 1003 ¶¶ 323–324). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence

that the prior art teaches or suggests the subject matter of this limitation as recited in claim 13.

- (5) “[13.8] *determine whether to route the computational operation to the flexible datacenter using the amount of BTM power that is available*”

Petitioner presents evidence that the combination of Kiani, Pelio, and Forestiero teaches this limitation, citing evidence presented for limitation [1.10], and then noting that it would have been obvious “to implement the distribution functionality decentralized at the datacenters [per Forestiero], instead of by centralized controller.” Pet. 88 (citing Ex. 1003 ¶¶ 325–328). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of this limitation as recited in claim 13.

- (6) “[13.9] *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 the combination of Kiani, Pelio and Forestiero teaches this limitation. Pet. 88. Petitioner first shows that the combination of Kiani and Pelio discloses, as shown in connection with limitation [1.11], assigning computational operations for performance at a flexible datacenter based on a determination to route a computational operation there. *Id.* (citing Ex. 1003 ¶¶ 329–330). Petitioner then shows that, in view of the teachings of Forestiero, it would have been obvious “to implement the distribution functionality, including assigning the workload,

decentralized at the datacenters,” because Forestiero teaches that “the DCMs (implemented by local controllers at Kiani’s datacenters) make determinations about workload distribution, including the assignment of the workload, amongst the datacenters.” *Id.* (citing Ex. 1009, 4; Ex. 1003 ¶¶ 331–332). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of this limitation as recited in claim 13.

(7) Claim 13: Conclusion

We find Petitioner has demonstrated by a preponderance of the evidence that the combination of Kiani, Pelio, Chapel, and Forestiero teaches or suggests all elements of claim 13. We also find Petitioner has demonstrated by a preponderance 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 full trial record, we determine Petitioner has demonstrated by a preponderance that claim 13 is unpatentable over the combination of Kiani, Pelio, Chapel, and Forestiero.

c. Claim 14

Claim 14 depends from claim 13, and recites “wherein the distributed queue system includes at least two queue subsystems having different rules for organizing computational operations.” Ex. 1001, 38:18–21.

Petitioner presents evidence that the subject matter of claim 14 is taught or suggested by Kiani. Pet. 89–90. In particular, Petitioner shows that Kiani discloses “at least two queue subsystems with a queue at each datacenter,” and also discloses “organizing computational operations at each datacenter in each datacenter’s queue according to rules,” wherein the queues each have an “upper bound” based “on the unique parameters of each datacenter.” *Id.* at 89–90 (citing evidence presented for limitations [1.5] and [1.6]; Ex. 1005, 3–5; Ex. 1003 ¶¶ 333–337). Petitioner also shows “Kiani’s variety of rules are determined to facilitate accomplishing the targeted QoS for the workload at each datacenter, including how to maximize green energy utilization, how to apply brown energy (and minimize its cost), and maintain QoS with brown energy.” *Id.* at 90 (citing Ex. 1005, 4; Ex. 1003 ¶¶ 338–340). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 14.

d. Claim 15

Claim 15 depends from claim 13 and recites “wherein the datacenter control system is configured to modulate power delivery to the plurality of computing systems based on an operational directive received from a remote master control system.” Ex. 1001, 38:21–26.

Claim 15 is substantively similar to claim 7, and Petitioner cites to the same evidence presented for claim 7. Pet. 90. We incorporate our determination herein for claim 7. *See supra* III.D.2.e.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner’s showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 15.

e. Claim 16

Claim 16 depends from claim 15 and recites “wherein the remote master control system is positioned remotely from the flexible datacenter.” Ex. 1001, 38:27-29.

Petitioner presents evidence that the subject matter of claim 16 is taught or suggested by Kiani, Pelio and Chapel. Pet. 90–91. In particular, Petitioner shows that Kiani teaches a “remote master control system” in the form of an FE server, which is “positioned remotely from the datacenters,” wherein the datacenters “are flexible datacenters” as disclosed by Kiani alone and combined with Pelio. Pet. 90 (citing evidence presented for claim 2; Ex. 1003 ¶¶ 343–345). Petitioner then shows “Chapel further teaches a local controller (a ‘*datacenter control system*’) receiving messages from a remote controller (a ‘*remote master control system*’) that identifies a power delivery modulation action, such as transitioning to an efficiency or brownout mode (an ‘*operational directive*’).” *Id.* at 90–91 (citing Ex. 1007 ¶¶ 58, 66, 76, 78–82, Figs. 3, 6; Ex. 1003 ¶¶ 346–352). We agree Petitioner’s cited evidence supports Petitioner’s contentions.

As noted above, Patent Owner has not filed a Patent Owner Response, and thus has not challenged Petitioner's showing.

Having considered the arguments and evidence on the full trial record, we find that Petitioner has demonstrated by a preponderance of the evidence that the prior art teaches or suggests the subject matter of claim 16.

f. Ground 4: Conclusion

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 13–16, challenged in Ground 4, are unpatentable over the combination of Kiani, Pelio, Chapel, and Forestiero.

IV. CONCLUSION¹¹

For the foregoing reasons, we find Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–16 are unpatentable, as set forth in the table below:

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 9–12	103	Kiani, Pelio	1, 2, 9–12	
4–8	103	Kiani, Pelio, Chapel	4–8	
3	103	Kiani, Pelio, Belady	3	
13–16	103	Kiani, Pelio, Chapel, Forestiero	13–16	
Overall outcome			1–16	

¹¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

In consideration of the full trial record before us, and for the foregoing reasons, it is:

ORDERED that claims 1–16 of U.S. Patent No. 11,283,261 B2 are held unpatentable;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2024-01361
Patent 11,283,261 B2

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