

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VMWARE, INC.,
Petitioner,

v.

CIRBA IP INC.,
Patent Owner.

IPR2021-00008
Patent 10,523,492 B2

Before DAVID C. McKONE, TERRENCE W. McMILLIN, and
RUSSELL E. CASS, *Administrative Patent Judges*.

CASS, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background*

In this *inter partes* review, VMWare, Inc. (“Petitioner”) challenges the patentability of claims 1–33 (the “challenged claims”) of U.S. Patent No. 10,523,492 B2 (Ex. 1001, “the ’492 patent”), which is assigned to Cirba IP Inc. (“Patent Owner”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed below, Petitioner has proven by a preponderance of the evidence that claims 1–33 are unpatentable.

B. *Procedural History*

In this proceeding, Petitioner relies upon the following references:

Power et al., U.S. Patent No. 7,616,583 B1, issued Nov. 10, 2009 (Ex. 1004, “Power”);

Kerr et al., U.S. Patent No. 8,606,886 B2, issued Dec. 10, 2013 (Ex. 1006, “Kerr”);

Van Hoose et al., U.S. Patent Publication No. 2004/0034577 A1, published Feb. 19, 2004 (Ex. 1005, “Van Hoose”); and

Le et al., U.S. Patent No. 7,356,679 B1, issued Apr. 8, 2008 (Ex. 1007, “Le”).

Pet. iv, 15.

Petitioner submits the Declaration of Dr. Nader F. Mir (Ex. 1002). Patent Owner submits the Declaration of Dr. Vijay Madiseti (Ex. 2015).

Petitioner challenges the patentability of claims 1–33 of the '492 patent based on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–5, 9–16, 20–27, 21–33	102(e) ¹	Power
1–33	103(a)	Power, Kerr
1–33	103(a)	Van Hoose, Le

Pet. 15. Patent Owner filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We instituted trial on all grounds of unpatentability. Paper 10 (“Inst. Dec.”), 41.

During the trial, Patent Owner filed a Response (Paper 13, “PO Resp.”), Petitioner filed a Reply (Paper 23, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 25, “PO Sur-reply”).

An oral hearing was held on February 9, 2022, a transcript of which appears in the record. Paper 35 (“Tr.”).

C. Real Parties in Interest

Petitioner states that “VMware, Inc.” is the real party in interest. Pet. 87. Patent Owner states that “[t]he real parties-in-interest are Cirba IP, Inc. and Cirba Inc. (d/b/a Densify).” Paper 3, 2.

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective as of March 16, 2013. The application for the '492 patent was filed after March 16, 2013, but includes a priority claim to an application filed before this date. Ex. 1001, code (22), (63). Petitioner contends that the challenged claims are entitled to an effective filing date of April 21, 2006, and that the pre-AIA versions of §§ 102 and 103 apply here. Pet. 12, 15. Patent Owner does not challenge this assertion. PO Resp. In this decision, we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

D. Related Proceedings

The parties identify the following district court case involving the '492 patent: *VMware, Inc. v. Cirba Inc. (d/b/a Densify)*, No. 1:20-cv-00272-LPS (D. Del.). Pet. 87; Paper 3, 2.

E. The '492 Patent (Ex. 1001)

The '492 patent relates to systems and methods for analyzing a collection of computers for consolidation based on various constraints, including compatibility. Ex. 1001, code (57). According to the '492 patent specification, challenges have arisen in managing distributed computing systems due to the sprawl that can occur over time as applications and servers proliferate, resulting in more processing capacity than is required by an organization. *Id.* at 1:45–56. Removing some of the servers from a large computing environment, the specification explains, can significantly reduce costs. *Id.* at 1:67–2:2.

To address this perceived concern, the '492 patent discloses an analysis program for determining compatibilities in a computing environment and identifying consolidation solutions, as shown, for example, in Figure 1 reproduced below.

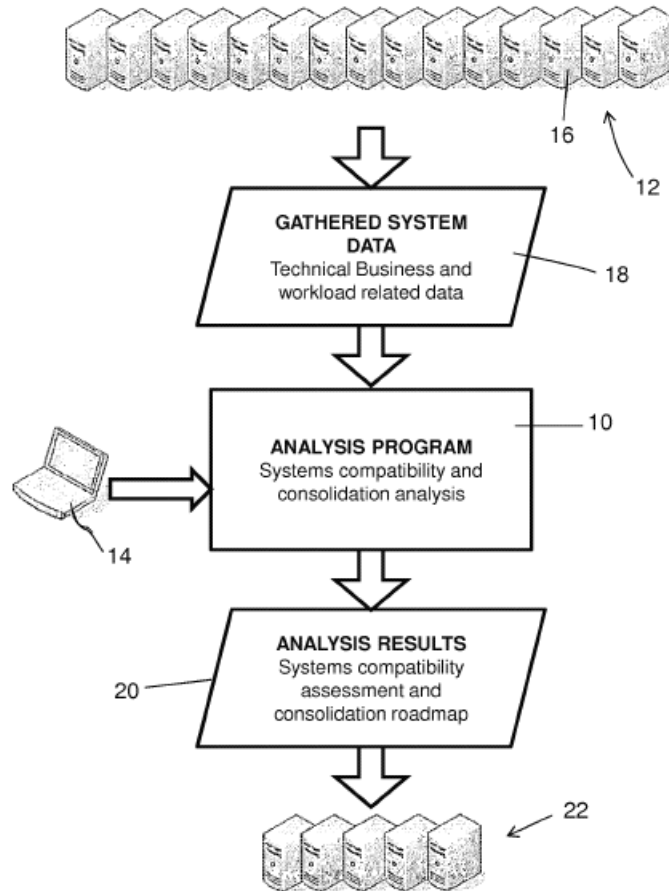


Figure 1

Figure 1 is a block diagram of an analysis program for evaluating the compatibility of computer systems to identify consolidation solutions.

Ex. 1001, 3:40–42, Fig. 1.

Ex. 1001, Fig. 1. As shown in Figure 1, an analysis program 10, accessed through a computer station 14, gathers data 18 pertaining to a collection of systems to be consolidated 16. *Id.* at 5:15–19. The data is obtained for each system and includes one or more parameters that preferably relate to technical, business, and workload characteristics or features of the respective system. Ex. 1001, 5:28–32. The analysis program 10 uses the gathered data 18 to evaluate the compatibility of the computer systems and provides a roadmap 20 specifying how the original set of systems can be consolidated

to a smaller number of systems 22. *Id.* at 5:19–23. The systems include source systems from which applications and/or data are to be moved, and target servers or systems to which such applications and/or data are to be moved. *Id.* at 5:56–59.

The compatibility analysis is performed using differential rule sets to evaluate and quantify the compatibility of systems and produce an overall compatibility score. Ex. 1001, 6:65–7:6. To assess the compatibility of transferring multiple source entities (N) to a target, a rule-based analysis can compute a compatibility score based on a combination of N-to-1 and N-by-N compatibility analyses. *Id.* at 30:2–5. An N-to-1 intercompatibility analysis “assesses each source system against the target” to generate a score that “reflect[s] the compatibility between N source entities and a single target.” *Id.* at 30:5–7, 30:45–47. An N-by-N intracompatibility analysis “evaluates each source system against each of the other source systems” to generate a score that “reflect[s] the compatibility amongst N source entities with respect to a given rule set.” *Id.* at 30:7–8, 31:50–52. Based on this analysis, a consolidation solution (or roadmap) is generated containing one or more transfer sets specifying one or more source entities and a common target. *Id.* at 6:41–50.

F. Illustrative Claims

Of the challenged claims, claims 1, 12, and 23 are independent. Claim 1 is illustrative and is reproduced below.

1. [a, Preamble] A computer implemented method for placing source systems on target systems, the method comprising:

[a1] evaluating one or more source systems against other source systems and against one or more target systems using at least one rule set that evaluates parameters of the

systems to determine whether the systems can or can not be placed together on a specific target system,

[a2] wherein the evaluating comprises one or more of: a 1-to-1 compatibility analysis, an N-to-1 compatibility analysis, or an N-by-N compatibility analysis; and

[b] placing the source systems onto the target systems in accordance with technical, business, and workload constraints determined in the compatibility analysis.

Ex. 1001, 38:37–48 (bracketed paragraph identifiers added).

II. DISCUSSION

A. Claim Construction

A claim “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2020). Petitioner states in its Petition that it “has not proposed any terms for construction because no constructions are necessary to resolve any disputes identified in this Petition.” Pet. 14. In its Preliminary Response, Patent Owner provided constructions for a number of terms, including “source system,” “target system,” “1-to-1 compatibility analysis,” “N-to-1 compatibility analysis,” “N-to-1 compatibility analysis,” and “N-by-N compatibility analysis.” Prelim. Resp. 17–20.

In our Institution Decision, we preliminarily adopted Patent Owner’s constructions, as follows:

“source system”: a system from which applications and/or data are to be moved;

“target system”: a system to which applications and/or data from a source system are to be moved;

“N-to-1 compatibility analysis”: an analysis that evaluates the compatibility of each of N source systems against a common target system; and

“N-by-N compatibility analysis”: an analysis that evaluates the compatibility of each of N source systems against each of the other source systems among the N source systems.

Inst. Dec. 8–9. These terms will be discussed further below. We also discuss the construction of the phrase “evaluating one or more source systems against other source systems,” which the parties raise in the post-institution briefing. PO Resp. 18–27; Pet. Reply 4–9; PO Sur-reply 7–11.

1. “*Source System*” and “*Target System*”

In its Patent Owner response, Patent Owner states that “source system” and “target system,” should be interpreted to be consistent with the ’492 patent specification’s “defining statement” that “a source system refers to a system from which applications and/or data are to be moved, and a target server or system is a system to which such applications and/or data are to be moved.” PO Resp. 13. Patent Owner further states that “neither party has presented any argument that requires the Board to construe ‘source system’ or ‘target system,’” and “[a]ccordingly, it is unnecessary for the Board to do so.” PO Sur-reply 2–3.

Petitioner asserts that “[t]he Board should not permit Patent Owner to disavow its own express definitions post-institution,” and that “Patent Owner proposed different constructions for these terms in the parallel litigation.” Pet. Reply 2 & n.2. Petitioner, however, does not assert that these terms must be expressly construed in order to resolve any dispute between the parties in this *inter partes* proceeding. We also note that similar terms have been the subject of claim construction proceedings in the district court litigation concerning the ’492 patent. *See* Ex. 2022 (Memorandum Opinion in Case No. 19-742-LPS) 9–12.

Based on the full trial record, we determine that the terms “source system” and “target system” need not be expressly construed to resolve the issues presented in this proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

2. “*N-to-1 Compatibility Analysis*” and “*N-by-N Compatibility Analysis*”

In its Patent Owner Response, Patent Owner acknowledges that our Institution Decision preliminarily adopted Patent Owner’s construction of “N-to-1 compatibility analysis,” but stated that “the Board did not explicitly indicate that it applied Patent Owner’s interpretation that ‘each source system is *separately and individually* evaluated against the target system,’” which Patent Owner applied in its arguments concerning Van Hoose. PO Resp. 13–14. Accordingly, Patent Owner proposes that the term “separately and individually” be included in the construction of “N-to-1 compatibility analysis.” *Id.* at 14–17. Petitioner disagrees that “separately and individually” should be included in the construction of “N-to-1 compatibility analysis.” Pet. Reply 2–4. The parties do not dispute the construction of “N-by-N compatibility analysis.” PO Resp. 18; Pet. Reply 1–9.

As discussed below, we find that all of the challenged claims have been shown to be unpatentable based on Grounds 1 and 2 involving Power and/or Power and Kerr. *See* §§ II.D, II.E, *infra*. Therefore, we need not decide whether the challenged claims are also unpatentable based on Ground 3 involving Van Hoose and Le. Because the parties’ dispute concerning the terms “N-to-1 compatibility analysis” and “N-by-N compatibility analysis”

relates to Ground 3, and is not necessary to resolve Grounds 1 and 2, we need not expressly construe these terms for purposes of this Decision, and decline to do so. *See Nidec*, 868 F.3d at 1017.

3. “*Evaluating one or more source systems against other source systems*”

Patent Owner argues that one of ordinary skill “would have understood ‘evaluating one or more source systems against other source systems,’ as used in the evaluating step, to directly compare source system[s] with other source systems.” PO Resp. 20; PO Sur-reply 7–11. Petitioner disagrees, arguing that the claim language has no “direct comparison” requirement. Pet. Reply 4–9.

More specifically, Patent Owner argues that its construction “is consistent with the import of the word ‘against,’ which is commonly understood to mean ‘compared or contrasted with.’” PO Resp. 20–21 (citing Ex. 2016 (Merriam Webster’s Collegiate Dictionary, 11th ed., 2003), 23; Ex. 2017 (Merriam Webster’s Collegiate Dictionary, 9th ed., 1983), 63; Ex. 2015 ¶ 109). Patent Owner asserts that “[t]he example used by the dictionary to explain that meaning is ‘profits are up [against] last year,’ which indicates a direct comparison with another, i.e., this year’s profits with last year’s profits.” *Id.* at 21. According to Patent Owner, “[t]he claims use the word ‘against’ in an ordinary sense, i.e., to require direct comparisons of ‘one or more source systems’ with ‘other source systems.’” *Id.* (citing Ex. 2015 ¶ 110).

Patent Owner also argues that “[t]he ’492 patent’s specification uses the word ‘against’ consistently with its commonly understood meaning of ‘compared or contrasted with’ and expresses no intent to impart a different meaning to that word.” PO Resp. 21. Patent Owner relies on the

specification's use of the term "against" in the context of the N-by-N compatibility analysis when it states that the N-by-N analysis "'evaluates each source system *against* each of the other source systems'" and "'is performed with respect to a given rule set and involves . . . [s]eparately evaluat[ing] each source entity *against* the other source entities with the rule set.'" *Id.* at 21–22 (citing Ex. 1001, 3:5–8, 31:50–64; Ex. 2015 ¶ 111). Patent Owner asserts that, "[a]s another example, the '492 patent describes the N-by-N compatibility analysis using a hypothetical analysis of a transfer set 't1' that is comprised of 'systems s1, s2 and s3 stacked onto s16,' whereby the N-by-N analysis evaluates s1 and s2 'against' each other, s2 and s3 'against' each other, and s1 and s3 'against' each other." *Id.* at 22 (citing 31:65–32:45).

Patent Owner also relies on the '492 patent specification's use of the word "against" in the context of evaluating source systems against target systems. PO Resp. 23. Patent Owner points to the '492 patent's statement that the 1-to-1 compatibility analysis "evaluates the compatibility of every specified system as source-target pairs" and yields "a compatibility score for each system *against* each other system." *Id.* at 24 (citing Ex. 1001, 9:48–54, 17:37–41; Ex. 2015 ¶ 114). Patent Owner also argues that, in discussing the N-to-1 compatibility analysis, the '492 patent specification "teaches that it 'assesses each source system *against* the target.'" *Id.* at 25–26 (citing Ex. 1001, 30:5–8, 30:46–56, 30:61–31:15; Ex. 2015 ¶ 115). Patent Owner further contends that Figures 26 and 39 show grids in which the compatibility analysis directly compares source systems with target systems. *Id.* at 23 (citing Ex. 1001, 37:18–21; Ex. 2015 ¶ 114).

Additionally, Patent Owner argues that the “surrounding claim language” supports its construction. PO Resp. 27–31. Patent Owner asserts that the “evaluating” step uses at least one “rule set,” and one of ordinary skill “would have understood ‘evaluating’ a system ‘against’ another system using a ‘rule set’ to directly compare the systems.” PO Resp. 29 (citing Ex. 2015 ¶ 121). For support, Patent Owner points to the ’492 patent specification’s statement that “[t]he rule sets . . . 28 determine whether or not a particular setting or system criterion/criteria have been met and thus *how different one system is to the next.*” *Id.* (citing Ex. 1001, 8:44–47). Patent Owner also points to the statement that “[r]ules evaluate data parameters according to rule definitions to determine incompatibilities due to differences (or contentious similarities) between the baseline [i.e., “source”] and target systems.” *Id.* (citing Ex. 1001, 11:6–9, 11:52–56, 10:51–53).

Patent Owner also argues that one of ordinary skill “would have considered how the ’492 patent describes the N-by-N compatibility analysis when interpreting the meaning of the ‘evaluating’ step because that step ‘comprises one or more of: a 1-to-1 compatibility analysis, an N-to-1 compatibility analysis, or an N-by-N compatibility analysis.’” PO Resp. 30. “In the context of the ’492 patent,” according to Patent Owner, one of ordinary skill “would have understood an N-by-N compatibility analysis to directly compare source systems against other source systems.” *Id.* (citing Ex. 2015 ¶¶ 124–125; Ex. 1001, 30:5–8, 31:65–32:45).

Petitioner responds that the plain meaning of “evaluating . . . against” does not require direct comparisons. Pet. Reply 5. Petitioner argues that our Institution Decision “recognized that ‘comparisons’ can be made ‘directly’

or ‘indirectly,’” and that “Patent Owner’s two dictionary definitions for ‘against’ are consistent with that understanding.” *Id.* Petitioner asserts that “the word ‘direct’ appears in neither definition.” *Id.* (citing PO Resp. 20 (defining “against” as “compared or contrasted with”)). Petitioner also contends that the dictionary’s example of “profits are up [against] last year” can involve an “indirect” comparison because, “[f]or example, by sorting profits over the last five years, one might see that this year’s profits are ranked first and last year’s are last.” *Id.* at 5–6.

Turning to the ’492 patent specification, Petitioner argues that the specification “discusses a rule that ‘operates ***directly against***’ audit data and detects cases where the operating system patch level differs.” Pet. Reply 6 (citing Ex. 1001, 14:20–25 (emphasis added)). Petitioner asserts that “[i]f ‘against’ required ‘direct’ comparisons, ‘directly against’ would be redundant.” *Id.* Thus, according to Petitioner, “Patent Owner knew how to claim a ‘direct’ comparison had it desired to do so.” *Id.*

Turning to the language in other parts of the claim, Petitioner disagrees that “the reference to ‘rule sets’” in the claim “requires direct source-to-source comparisons.” Pet. Reply 6. Petitioner asserts that the claim language “does not use the word ‘direct’” or “require that ‘rule sets’ perform direct comparisons,” and “nothing in the specification mandates that ‘rule sets’ perform only direct comparisons.” *Id.* at 7. Petitioner also argues that “the plain claim language does not require that rule sets be used for source-to-source evaluation,” but instead “states only that rule sets must be used in *some* evaluation(s) and must evaluate ‘parameters,’ not that the rule[] sets must be used in *all* evaluations.” *Id.* (citing Ex. 1001, claim 1).

“For example,” Petitioner contends, claim 1 “permits evaluating rules for source-to-target, but not source-to-source evaluations.” *Id.*

Additionally, Petitioner disagrees that “the specification’s description of the optional N-by-N compatibility analysis justifies requiring ‘direct’ comparisons between source systems.” Pet. Reply 7 (citing PO Resp. 30–31). According to Petitioner, “[t]he ‘evaluating’ limitation does not *require* an N-by-N compatibility analysis,” but instead “requires only ‘*one or more of* a 1-to-1 compatibility analysis, an N-to-1 compatibility analysis, and N-by-N compatibility analysis.’” *Id.* (citing PO Resp. 28 (emphasis added)). Petitioner asserts that the ’492 patent specification’s support for the claimed source-to-source evaluation is not limited to an N-by-N analysis, and that “the specification repeatedly discloses ‘sort[ing]’ a group of source systems and ‘compiling’ candidate transfer sets from the sorted source systems.” *Id.* at 7–8 (citing Ex. 1001, 35:38–41, 35:32–33, 36:37–41).

Patent Owner responds that “Petitioner’s dictionary-based arguments are divorced from the specification,” and the fact “[t]hat comparisons can, as a *general* matter, be made ‘directly’ or ‘indirectly’ does not dictate the meaning of ‘evaluate . . . against’ in the context of the ’492 patent.” PO Sur-reply 7–8. “Every disclosure in the specification,” Patent Owner asserts, “consistently requires a direct comparison between systems.” *Id.* Patent Owner also argues that the specification’s use of the term “directly against” is “inapposite” because it is used in a “different context” than evaluating one source system against other source systems. *Id.* at 9. In response to Petitioner’s argument that neither the claims nor the specification requires or mandates that rule sets perform direct comparisons, Patent Owner asserts that “no such express definition is required,” and that such a definition “may

be implied by the specification.” *Id.* at 10. Finally, Patent Owner accuses Petitioner of interpreting the phrase “evaluating . . . against” in “a vacuum, divorced from the surrounding claim language, including the recited ‘N-by-N compatibility analysis.’” *Id.* at 11 (citing Pet. Reply at 7).

Based on the full trial record, we agree with Petitioner that “evaluating one or more source systems against other source systems” should not be construed to require “directly” comparing source systems with other source systems. First, there is nothing in the plain meaning of the claim language itself that requires a “direct” comparison. The dictionary definitions relied on by Patent Owner define “against” as “compared or contrasted with,” which does not require that the comparison be “direct.” Ex. 2016, 23; Ex. 2017, 63. The dictionary’s example of “profits are up [against] last year,” is only one example, and also does not necessarily require a direct comparison because, as Petitioner points out, by sorting profits over the last five years, one might see that this year’s profits are ranked first and last year’s are last. Pet. Reply, 5–6.

The ’492 patent specification also supports construing “evaluating . . . against” as not restricted to only “direct” comparisons. The specification uses the term “directly against,” which implies that the term “against” is not limited to only “direct” comparisons. Ex. 1001, 14:20–22. *See Philips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (“[T]he claim in this case refers to ‘steel baffles,’ which strongly implies that the term ‘baffles’ does not inherently mean objects made of steel.”). Thus, the inventors knew how to refer to “direct” comparisons, and chose not to do so in the claims.

Moreover, we do not agree with Patent Owner’s argument that the claims must be limited to “direct” comparisons between source systems

because the specification describes only embodiments using direct comparisons for evaluating sources against each other. As the Federal Circuit explained in *Philips*,

[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claim to those embodiments. In particular, we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.

Philips, 415 F.3d at 1323 (citations omitted).

We do not see anything in the '492 patent specification that explicitly or implicitly defines “evaluating . . . against” to require direct comparisons, or suggests that direct comparisons are an essential aspect of the invention. Moreover, many of the portions of the specification that Patent Owner relies on specifically discuss the N-to-1, N-by-N, and 1-to-1 compatibility analyses. PO Resp. 21–23 (relying on portions discussing N-by-N analysis) (citing Ex. 1001, 3:5–8, 31:65–32:45), 25 (relying on portions discussing 1-to-1 analysis) (citing Ex. 1001, 9:48–54, 17:37–41), 25–26 (relying on portions discussing N-by-1 analysis) (citing Ex. 1001, 30:5–8, 30:46–56, 30:61–31:15; Ex. 2015 ¶ 115). These analyses are not recited as part of and are not required by the claim language at issue here, which only requires “evaluating one or more source systems against other source systems.”

We also do not agree with Patent Owner’s argument that claim 1’s later language that the evaluation is performed “using at least one rule set” and may include “an N-by-N compatibility analysis” suggest that “evaluating . . . against” requires a direct comparison. PO Resp. 27–31. Both of these are separate limitations, and even if they did require “direct” comparisons, that would not mean that the language reciting “evaluating one

or more source systems against other source systems” would itself require direct comparisons. And, in any event, we do not see anything in the claim language or the ’492 patent specification that indicates that rule sets can only be used for “direct” comparisons. Patent Owner cites to the specification’s statement that rule sets “determine whether or not a particular setting or system criterion/criteria have been met and thus *how different one system is to the next*,” but this could be done by comparing each system to a reference criteria (such as amount of memory) and sorting the systems based on how they compare under that criteria, rather than by doing a direct 1-to-1 comparison between the systems. PO Resp. 29 (citing Ex. 1001, 8:44–47). The specification’s statement that “[r]ules evaluate data parameters according to rule definitions to determine incompatibilities due to differences (or contentious similarities) between the baseline [i.e., ‘source’] and target systems,” relied on by Patent Owner, could also cover comparing systems to a standard and sorting them based on the standard, rather than a direct 1-to-1 comparison between individual source systems. As to the N-by-N compatibility analysis, we agree with Petitioner that claim 1 does not *require* an N-by-N compatibility analysis, but instead specifies a number of options (including 1-to-1 and N-to-1 analyses) that can be used. Pet. Reply 7.

For the foregoing reasons, and based on the full trial record, we determine that “evaluating one or more source systems against other source systems,” does not require “directly” comparing source system(s) with other source systems. We also determine that this term does not require further construction to resolve the parties’ disputes in this proceeding. *See Nidec*, 868 F.3d at 1017.

4. *Other Terms*

Based on the full trial record, no other claim terms require express construction to resolve the issues presented in this proceeding. *See Nidec*, 868 F.3d at 1017.

B. *Principles of Law*

A claim is unpatentable under 35 U.S.C. § 102 if a single prior art reference discloses each and every limitation of the claimed invention, either explicitly or inherently. *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014). A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference. *Id.*

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *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 skill in the art; and (4) where in evidence, objective evidence of non-obviousness.² *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re*

² Patent Owner has not presented objective indicia of non-obviousness in this proceeding.

Kahn, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–17.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention “would have at least a bachelor’s degree in computer science, computer engineering, or electrical engineering and 2–3 years of experience related to administering distributed computing environments,” and that a “master’s degree or higher is acceptable in place of work experience.” Pet. 13 (citing Ex. 1002 ¶ 21). In the Preliminary Response, Patent Owner did not object to Petitioner’s proposed level of ordinary skill, but reserved the right to dispute it if an *inter partes* review was instituted. Prelim. Resp. 13. In our Institution Decision, we adopted Petitioner’s assessment of the level of ordinary skill in the art, determining that it is consistent with the ’492 patent and the asserted prior art of record. Inst. Dec. 12.

During the trial, Patent Owner stated that it does not offer a competing definition of a person of ordinary skill in the art for purposes of this

proceeding. PO Resp. 10. Based on the full trial record, we adhere to the level of ordinary skill set forth in our Institution Decision.

D. Ground 1: Anticipation of Claims 1–5, 9–16, 20–27, and 31–33 by Power

Petitioner contends that claims 1–5, 9–16, 20–27, and 31–33 are anticipated by Power. Pet. 15–42. Patent Owner disagrees, arguing that the claimed combination does not disclose: (1) “evaluating one or more source systems against other source systems,” as recited, for example, in limitation 1[a1], and [2] the claimed “business constraints,” as recited, for example, in limitation 1[b]. PO Resp. 32–58. For the reasons discussed below, Petitioner has proven by a preponderance of the evidence that the claims challenged in this ground are anticipated by Power.

1. Overview of Power (Ex. 1004)

Power is directed to a method for consolidating computer hardware devices running a plurality of applications into a smaller number of hardware devices. Ex. 1004, 1:19–27. The system first conducts a survey of hardware devices, which identifies the hardware devices to be consolidated, and obtains each hardware device’s physical and logical capacities, functional attributes, technical attributes, and financial attributes. *Id.* at 5:36–6:44. The system then receives “future hardware state criteria,” which “may comprise any criteria suitable for defining the goals of consolidating an enterprise’s hardware devices.” *Id.* at 9:14–17. The future hardware state criteria may include, for example, target physical and/or logical consolidation ratios, target utilization percentages for each hardware device, target network loads, reduction in lease or financing commitments, or reduction in average costs per period. *Id.* at 9:17–26.

The system may receive multiple hardware state criteria, along with priorities for ranking the multiple criteria. Ex. 1004, 9:37–38. Power provides the following example of criteria ranked by priority:

PRIORITY 1: Lease expiration or max depreciation > 1 year away

PRIORITY 2: Peak utilization > 50% capacity

PRIORITY 3: Peak utilization + Projected growth < 95% capacity

Ex. 1004, 12:16–23. Hardware devices identified in the hardware survey are grouped into categories based on whether they meet or fail to meet these criteria. *Id.* at 12:13–16. Hardware devices that meet all future state criteria are considered “target candidates.” *Id.* at 12:31–32. Hardware devices that do not meet all criteria are considered “source candidates,” and “are further sorted by whether they fail to meet the highest priority future state criterion; whether they meet the highest priority future state criterion but not the second; and whether they only fail to meet the lowest priority [] future state criterion.” *Id.* at 12:27–31.

Power explains that “[s]ource candidates are analyzed one at a time and paired with target candidates.” Ex. 1004, 12:33–34. In this analysis, source candidates are “identified in order of the priority of the criteria that they do (or do[] not[]) meet.” *Id.* at 12:35–37. In the above example, “hardware devices having less than one year remaining on their leases, or less than one year until they are fully depreciated, are the first to be identified as source candidates and paired to target candidates.” *Id.* at 12:37–40. “Next, any remaining hardware devices whose peak utilization is less than fifty percent (50%) capacity are identified as source candidates and paired to target candidates.” *Id.* at 12:40–43. “Finally, any remaining

hardware devices whose peak utilization and projected growth equals more than ninety-five percent (95%) of capacity are identified as source candidates and paired to target candidates.” *Id.* at 12:43–47. Because those hardware devices that do not meet the highest priority future state criteria are matched with target hardware devices first, it is more likely that those devices will be matched with target devices having the capacity to accommodate their contents. *Id.* at 12:47–51.

Power explains that “[o]nce a target candidate is identified, an iterative comparison of the source candidate with each target candidate is performed.” Ex. 1004, 13:8–10. This process compares the attributes (received in the hardware survey) of each source candidate with those of each target candidate. *Id.* at 13:11–14. If there are no more target candidates to compare with the source candidate, then the placement of the source candidate in the future state is determined. *Id.* at 13:37–40. The method then determines whether any other source candidates exist, and if so, identifies the next source candidate and repeats the analysis until all source candidates are exhausted. *Id.* at 14:14–18.

2. Analysis of Independent Claim 1

a) 1[pre]: “[a] computer implemented method for placing source systems on target systems”

Petitioner asserts that, to the extent the preamble of claim 1 is limiting, Power teaches the subject matter of the preamble. Pet. 23. Specifically, Petitioner states that Power discloses “a computer-implemented method for costing and planning the consolidation of multiple source server computers or other source computer hardware devices to fewer target server computers or other target hardware devices.” *Id.* (quoting Ex. 1004, 3:22–26). Petitioner further contends that “Power claims ‘[a] computer-

implemented method for consolidating servers of an enterprise,’ that further comprises ‘the step of migrating the workload of the other servers to the corresponding servers.’” *Id.* (internal citations omitted). According to Petitioner, “migrating” corresponds to the “placing” recited in the preamble. *Id.* (citing Ex. 1002 ¶¶ 102–103).

Patent Owner does not present arguments regarding the preamble. *See generally* PO Resp. 32–58.

We agree with Petitioner that Power’s teaching of “consolidating servers on an enterprise” by “migrating the workload of the other servers to the corresponding servers” discloses a computer implemented method for placing source systems on target systems, as recited in the preamble.³

b) 1[a1]: “evaluating one or more source systems against other source systems and against one or more target systems using at least one rule set that evaluates parameters of the systems to determine whether the systems can or can not be placed together on a specific target system”

(1) “evaluating one or more source systems against other source systems”

Petitioner argues that Power “evaluate[s] one or more source systems against other source systems,” as required by limitation 1[a1]. Pet. 24–25. Petitioner relies on Power’s disclosure that the source candidates are sorted based on (1) whether they fail to meet the highest priority future state criterion, (2) whether they meet the highest priority future state criterion but not the second, and (3) whether they only fail to meet the lowest priority future state criterion. *Id.* at 24 (citing Ex. 1004, 12:26–31); *see* § II.D.1,

³ Because we are persuaded that Petitioner has shown that Power teaches the subject matter recited in the preamble, we need not decide whether the preamble is limiting.

supra. Then, according to Petitioner, “where sources are identified prior to being analyzed against targets, they are ‘identified in order of the priority of the criteria’ by which they were sorted.” Pet. 24 (citing Ex. 1004, 12:35–37).

Relying on Dr. Mir, Petitioner argues that “[e]ach instance in which sources are ‘sorted’ or ‘identified in order’ based on the future state criteria constitutes an evaluation of one or more source systems against other source systems.” *Id.* (citing Ex. 1002 ¶¶ 104–105). Petitioner also argues that Power discloses sorting the sources and then comparing them “in order of priority” to a target to determine which source-target pairs will be analyzed for compatibility first. *Id.* (citing Ex. 1004, 12:13–37, 13:4–12).

Patent Owner argues that “Power does not disclose ‘evaluating one or more source systems against other source systems’ as properly construed, i.e., where the evaluating involves directly comparing source systems with each other.” PO Resp. 36 (citing Ex. 2015 ¶ 162); *see* PO Sur-reply 12–16. According to Patent Owner, “Power ‘sorts’ and ‘identifies in order’ each source candidate individually, based solely on that source candidate’s own parameters, without comparing the source candidate to another source candidate,” which “does not disclose a comparison of source candidates *against* each other,” or “have the effect of doing so.” *Id.* at 37 (citing Ex. 2015 ¶ 164). Patent Owner asserts that in Power “a source candidate’s parameters are never compared with another source candidate’s parameters” and, “[i]ndeed, nothing about a source candidate is ever compared with another source candidate.” *Id.*

Patent Owner illustrates its argument by analogizing each of Power’s exemplary future state criterion to a bucket, and assigning each bucket a

priority from 1 to 3. PO Resp. 38–44. Taking three source systems S1–S3, according to Petitioner, Power would sort each source system into the highest priority bucket for which it fails to meet the corresponding future state criteria. *Id.* at 39 (citing Ex. 2015 ¶ 168). Patent Owner argues that this teaches “comparing source candidates against future state criteria—not against other source candidates—in order to sort any given source candidate into its appropriate bucket.” *Id.* (citing Ex. 2015 ¶ 169). For example, according to Patent Owner, “[t]he sorting” of a first source candidate (S1) into the “Priority 1” bucket “has nothing to do with S2 or S3” but is “based solely on S1,” and “[t]he same is true for S2 and S3, respectively.” *Id.* at 40–41 (citing Ex. 2015 ¶¶ 171–172). Thus, according to Patent Owner, Power’s sorting process does not involve “comparing a source candidate’s parameters with another source candidate’s parameters,” “comparing the priority of a source candidate’s failed criteria,” or “any comparison of a source candidate with another source candidate.” *Id.* at 39.

Additionally, Patent Owner argues that “Power’s process of ‘identifying’ source candidates ‘in order of priority’ does not evaluate source systems ‘against’ other source systems.” PO Resp. 42 (emphasis omitted). Patent Owner asserts that the process of identifying source candidates for pairing with target candidates “in order of the priority of the criteria that they do (or do) not meet” pairs the sources “without ever comparing any of the source candidates with other source candidates.” *Id.* at 42–43 (citing Ex. 1004, 12:33–37; Ex. 2015 ¶ 177). Continuing with its bucket analogy, Patent Owner explains that “Power simply starts with the highest priority bucket, identifies the source candidates in that bucket for pairing with a target candidate, and then moves to the next bucket, and so on.” *Id.* at 43

(citing Ex. 2015 ¶ 177). According to Patent Owner, “the priority ordering of the buckets (which dictates the order in which buckets are emptied) is defined —*a priori*—it does not depend on any comparisons between source candidates.” *Id.* at 44 (citing Ex. 2015 ¶ 178). Thus, Patent Owner contends, this “evaluation does not involve directly comparing a source candidate with other source candidates—it only involves comparing an individual source candidate’s parameters to the future state criteria.” *Id.*

In response, Petitioner argues that Patent Owner relies on its construction of the “evaluating . . . against” limitation as requiring “direct” comparisons, which is incorrect. Pet. Reply. 9. Petitioner also argues that Power’s sorting based on future state criteria “compares the source systems indirectly by comparing their parameters using thresholds that define the ‘future state criteria’ and the source systems’ relative priority.” *Id.* at 10. “For example,” Petitioner asserts, “a source system having a year or less remaining on its lease will have a higher priority than one with more than a year left” because “the former system needs to be consolidated more urgently.” *Id.* (citing Ex. 1004, 12:33–47). Thus, according to Petitioner, Power “discloses evaluating source systems against each other by, for example, comparing the time remaining on their leases to a threshold value (*i.e.*, one year) and using that result to determine their relative priorities.” *Id.* Petitioner further argues that “Patent Owner’s ‘bucketing’ analogy illustrates how Power’s sorting indirectly compares source systems and thus meets the ‘evaluating’ limitation,” because it “involves indirect comparisons of the source systems’ parameters (*e.g.*, comparing remaining lease time or utilization levels) to determine the systems’ relative priorities.” *Id.* at 10–11.

Petitioner also argues that “Power’s disclosure that source systems ‘should be identified in order of the priority of the criteria that they do (or do) not meet’ also satisfies ‘evaluating’ sources against other sources.” Pet. Reply 12 (citing Ex. 1004, 12:33–37). “Using Patent Owner’s bucket analogy,” according to Petitioner, “the buckets are processed ‘in order of the[ir] priority’” which “requires comparing the buckets’ relative priorities, and thus the source systems the buckets contain.” *Id.* (citing Ex. 1004, 12:35–37). Petitioner contends that “[o]ne can determine which bucket to overturn based on a direct comparison (*e.g.*, comparing the relative priorities of buckets or the source systems they contain) or an indirect comparison (*e.g.*, selecting the next highest priority bucket in a pre-sorted list).” *Id.* at 12–13. “Either way,” according to Petitioner, “Power’s ‘identification [of source systems] in the order of the priority’ has ‘the effect of evaluating one or more source systems against other source systems, even if two individual source systems are not directly compared with each other in the process.’” *Id.* at 13 (citing Inst. Dec. 18).

Based on the full trial record, we find that Power’s “sorting” and “ordering” of source candidates discloses “evaluating one or more source systems against other source systems” as claimed. As discussed in Section II.A.3 above, we agree with Petitioner that “evaluating one or more source systems against other source systems” does not require a “direct” comparison between source systems. Given this understanding, we find that Power’s sorting of source candidates based on “future state criteria” evaluates source candidates against each other. As discussed above, Power lists the following three examples of “future state criteria” ranked by priority:

PRIORITY 1: Lease expiration or max depreciation > 1 year
away

PRIORITY 2: Peak utilization > 50% capacity

PRIORITY 3: Peak utilization + Projected growth < 95%
capacity

Ex. 1004, 12:16–23.

In this analysis, source candidates are “identified in order of the priority of the criteria that they do (or do[] not[]) meet.” *Id.* at 12:35–37. Thus, “hardware devices having less than one year remaining on their leases, or less than one year until they are fully depreciated, are the first to be identified as source candidates and paired to target candidates.” *Id.* at 12:37–40. “Next, any remaining hardware devices whose peak utilization is less than fifty percent (50%) capacity are identified as source candidates and paired to target candidates.” *Id.* at 12:40–43. “Finally, any remaining hardware devices whose peak utilization and projected growth equals more than ninety-five percent (95%) of capacity are identified as source candidates and paired to target candidates.” *Id.* at 12:43–47.

We find that this process “evaluat[es] one or more source systems against other source systems” because it takes a group of source systems and compares them using a common set of criteria as a reference point to rank them in priority order. The fact that a common reference criteria is used for the evaluation instead of a a 1-to-1 comparison of each source system against each other source system does not mean that Power does not compare source systems with each other. For example, measuring the weight of each of a set of items using a scale, placing the items into buckets based on weight ranges, and then ordering the items by weight by emptying the buckets in order from the heaviest to the lightest would indirectly

compare the weight of these items, even though a direct comparison of individual items was not performed. Similarly, ranking a group of source systems in priority order based on whether they meet (or fail to meet) various criteria involves indirectly comparing the source systems based on those criteria.

Finally, we do not agree with Patent Owner’s argument that Power’s evaluation of source systems “does not involve directly comparing a source candidate with other source candidates—it only involves comparing an individual source candidate’s parameters to the future state criteria.” PO Resp. 44. This argument depends on Patent Owner’s construction of the “evaluating . . . against” limitation as being limited to “direct” comparisons—a construction we have rejected. *See* § II.A.3, *supra*.

For the foregoing reasons, and based on the full trial record, Petitioner has proven by a preponderance of the evidence that Power discloses “evaluating one or more source systems against other source systems.”

(2) “*evaluating one or more source systems . . . against one or more target systems*”

Petitioner argues that, because Power identifies a consolidation solution for a group of systems that it divides into sources and targets, Power discloses evaluating one or more source systems against one or more target systems. Pet. 25 (citing Ex. 1004, 3:21–26, 3:59–4:3; Ex. 1002 ¶¶ 106–107). Specifically, Petitioner argues, once source and target candidates are identified, Power discloses an “iterative comparison” that evaluates the attributes of the source(s) against those of the target(s). *Id.* (citing Ex. 1004, 13:7–11, Fig. 6). According to Petitioner, when a source-target match is found, the match is added to a future state list and the capacity of the target is updated in accordance with the demands of the source. *Id.* (citing

Ex. 1004, 14:7–11). Then, Petitioner argues, the algorithm moves to the next identified source system, comparing the remaining source systems against target systems, including the updated target. *Id.* (citing Ex. 1004, 14:7–21, Fig. 6).

Patent Owner does not present arguments regarding this claim language. *See generally* Prelim. Resp.

We agree that Power’s description of using an “iterative comparison” that evaluates the attributes of the sources against those of the targets discloses “evaluating one or more source systems . . . against one or more target systems.” Thus, based on the full trial record, we find that Petitioner has proven by a preponderance of the evidence that Power satisfies this limitation.

(3) “*using at least one rule set that evaluates parameters of the systems to determine whether the systems can or can not be placed together on a specific target system*”

Petitioner asserts that Power’s evaluation uses multiple “rule sets” to evaluate parameters of the system, including: (1) a rule set telling the system which attributes to measure and store in the initial survey of hardware devices; (2) a rule set that groups source systems into categories and ranks them, and (3) a rule set to determine source-target matches. *Id.* at 25–26 (citing Ex. 1004, 12:13–32, 13:12–30, 13:49–63, Figs. 2–3; Ex. 1002 ¶¶ 77–82, 109–110).

Petitioner further argues that this analysis determines whether source systems can or cannot be placed together on a specific target system. Pet. 26–27. “As explained previously,” Petitioner asserts, “Power’s initial analysis stage evaluates whether systems are ripe for consolidation and which are not by dividing the systems into sources and targets.” *Id.*

“Systems identified as sources,” according to Petitioner, “do not meet one or more future state criteria—for example, because they are approaching a lease expiration or are over-utilized—and are marked eligible for pairing with targets.” *Id.* at 27 (citing Ex. 1004, 12:24–32). Thus, “[s]ystems identified as targets ‘can not’ be placed on another target system because Power has determined that they already meet the future state criteria of the consolidation.” *Id.* According to Petitioner, “Power then evaluates whether the designated source systems can or cannot be placed on a specific target based on the compatibility between each system and the target as well as the target’s utilization.” *Id.* (citing Ex. 1004, 13:8–30, 13:45–49; Ex. 1002 ¶ 112).

Petitioner further argues that “Power evaluates whether the systems can be placed ‘together’ on a specific target because it discloses an iterative compatibility analysis.” Pet. 27 (citing Ex. 1002 ¶ 113). “That is,” Petitioner asserts, “once a first source system is matched with a specific target, the capacity of the target is ‘updated to reflect the effect of migrating the source candidate’s applications to the target candidate,’ and then further systems are compared against the modified target.” *Id.* (citing Ex. 1004, 14:7–11).

In its Patent Owner Response, Patent Owner identifies “determin[ing] whether the systems can or can not be placed together on a specific target system” as a limitation that is not met. PO Resp. 32. Patent Owner does not present argument in its Patent Owner Response explaining why this limitation is not met. *Id.* at 32–49. However, during the hearing, Patent Owner argued that Power does not disclose determining whether source systems can or cannot be placed together on a target because “[t]he only

thing that controls whether or not [a] source goes on a target is a source's relationship with a target," such that "[i]f there's enough room on the target, all the sources can go on." Tr. 53:12–57:11, 89:1–95:1. Thus, according to Patent Owner, Power never considers whether sources have incompatibilities that would prevent them from being placed together on a particular target. *Id.* At the hearing, Petitioner asserted that Patent Owner was raising a new argument that was not in its briefing. *Id.* at 73:22–74:1.

We find that Patent Owner's argument at the hearing that Power does not disclose "determin[ing] whether the systems can or can not be placed together on a specific target system" is a new argument that was not raised in the Patent Owner Response or Sur-reply, and therefore that it has been waived. As explained in the Board's Trial Practice Guide, "any arguments for patentability not raised in the response may be deemed waived," and during an oral hearing, a party "may only present arguments relied on in the papers previously submitted." Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) ("CTPG"),⁴ 85–86, 94; *see* Paper 11 (Scheduling Order), 6 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed waived"); Paper 28 (Order Setting Oral Argument), 3 (referring to "the strict prohibition against the presentation of new evidence or arguments at a hearing"). In the Patent Owner Response, Patent Owner states that the language "determine whether the systems can or can not be placed together on a specific target system" is not disclosed by Power (PO Resp. 32–33), but never presents argument in the Patent Owner Response explaining why Power does not meet this limitation. Rather, the Patent Owner Response limits its arguments for this

⁴ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

ground to whether Power discloses “evaluating one or more source systems against other source systems” (PO Resp. 34–50), and whether Power discloses the claimed “business constraints” (PO Resp. 50–58).

When asked during the hearing where this argument was raised in its papers, Patent Owner pointed to page 28 through the top of page 30 of the Patent Owner Response. Tr. 89:26–91:8. This portion of the Patent Owner Response, however, is part of the claim construction section discussing the construction of the term “evaluating one or more source systems against other source systems.” PO Resp. 18, 28–30. It is not part of the argument for why Power does not anticipate. PO Resp. 32–58. In the Response, Patent Owner does not offer a construction for “determine whether the systems can or can not be placed together on a specific target system” or explain why this limitation is not met by Power. *Id.* at 13–58. Additionally, no such argument was made in Patent Owner’s Sur-reply. PO Sur-reply 2–18. For these reasons, we find that this argument was waived.

Moreover, even if we were to consider this argument, we find that Petitioner has shown that Power meets this limitation. The phrase “to determine whether the systems can or can not be placed together on a specific target system” follows the language requiring evaluation of “one or more source systems against other source systems *and* against one or more target systems using at least one rule set.” Thus, this portion of the claim only requires that the overall process of evaluating sources against each other and against targets using one or more rule sets “determine[s] whether the systems can or can not be placed together on a specific target system.” It does not require that the evaluation of “one or more source systems against other source systems,” considered in isolation and without the other portions

of the evaluation, must by itself “determine whether the systems can or can not be placed together on a specific target system.”

Power discloses determining whether systems can or can not be placed together on a specific target system by: (1) evaluating systems to identify systems that meet all of the future state criteria as “targets,” which means that they “can not” be placed on another target system (Ex. 1004, 12:24–32), and (2) using an iterative compatibility analysis where, once a first source system is matched with a specific target, the capacity of the target is “updated to reflect the effect of migrating the source candidate’s applications to the target candidate,” and further systems are then compared against the modified target (Ex. 1004, 14:7–11; Ex. 1002 ¶ 113). We also find credible and agree with Dr. Mir’s testimony that “[c]omparing multiple sources to the same target through this iterative process requires considering whether the sources can be placed ‘together’ on the target because the target is evaluated to determine whether it has sufficient capacity to accommodate both source systems.” Ex. 1002 ¶ 113.

For the foregoing reasons, Petitioner has proven by a preponderance of the evidence that Power meets this limitation.

c) 1[a2]: “wherein the evaluating comprises one or more of: a 1-to-1 compatibility analysis, an N-to-1 compatibility analysis, or an N-by-N compatibility analysis”

Petitioner argues that only one of the recited analyses are required by this claim element, and that Power discloses at least an N-to-1 compatibility analysis. Pet. 28. Petitioner asserts that Power discloses that “an iterative comparison of the source candidate with each target candidate is performed” and that, subsequently, “it is determined whether any other source candidates exist.” *Id.* (citing Ex. 1004, 13:8–12, 14:14–18). If so, according

to Petitioner, the iterative comparisons “are repeated until all source candidates are exhausted.” *Id.* Thus, Petitioner argues, Power discloses comparing multiple sources against at least one target. *Id.* (citing Ex. 1002 ¶¶ 115–117).

Petitioner provides an illustration of how the above process is an N-to-1 compatibility analysis for an example involving a pool of three systems that the user wishes to consolidate onto one of the systems. Pet. 28–30. In Petitioner’s example, S1 and S2 are source systems because they do not meet all future state criteria, and S3 is a target system because it meets all future state criteria. *Id.* at 29. In this situation, Petitioner argues that Power’s iterative comparison will produce one of two outcomes:

Outcome 1

Round	Analysis	Action
1	S2 compared against S3; Systems found incompatible	Retire S2
2	S1 compared against S3	

Outcome 2

Round	Analysis	Action
1	S2 compared against S3; Systems found compatible	S2 to be consolidated onto S3. Add S3(S2), the consolidation of S2 onto S3, to the future state list and update the properties of S3 to reflect the consolidation
2	S1 compared against S3(S2)	

Pet. 29–30 (citing Ex. 1004, 13:18–63, 14:7–18). Petitioner does not specify an “action” in the tables above for the comparison of S1 against S3 in Round 2, but we understand that S1 will either be consolidated onto S3 or retired. *See* Ex. 1004, 13:45–52, 14:7–13. Under either outcome, according

to Petitioner, both of the available sources (S1 and S2) will have been analyzed against the only target, S3, resulting in an N-to-1 analysis. *Id.* at 30 (citing Ex. 1002 ¶¶ 118–122).

Petitioner further argues that Power can perform an N-to-1 compatibility analysis when multiple target candidates are identified if the same target proves to be the best consolidation candidate for each source. Pet. 30 (citing Ex. 1002 ¶¶ 123–127).

Patent Owner does not present arguments regarding this limitation. *See* PO Resp. 32–58.

We have reviewed Petitioner’s arguments and the underlying evidence cited in support and are persuaded that Petitioner sufficiently establishes that Power discloses limitation 1[a2]. Specifically, we agree that Power’s iterative comparison of a source candidate with each target candidate, and its subsequent use of this iterative comparison for additional source candidates, discloses an “N-to-1 compatibility analysis.” We also agree that Petitioner’s proposed example using three systems S1–S3 where S1 and S2 are source systems and S3 is a target systems would result in an outcome where both of the available sources have been analyzed against the only target (S3), resulting in an N-by-1 analysis.

For the foregoing reasons, Petitioner has proven by a preponderance of the evidence that Power discloses limitation 1[a2].

d) 1[b]: “placing the source systems onto the target systems in accordance with technical, business, and workload constraints determined in the compatibility analysis”

Petitioner argues that Power’s compatibility analysis considers technical, business, and workload “attributes” of the systems, which are

queried during the initial hardware survey. Pet. 30–31 (citing Ex. 1004, 5:51–7:31). Specifically, Petitioner points to the following disclosures:

Technical Constraints: “The survey of hardware devices also includes technical attributes of each hardware device identified in the survey.” (Ex. 1004, 6:4–5; *id.*, 5:51–6:24 (enumerating examples); Ex. 1002, ¶¶128–29.)

Business Constraints: “The survey of hardware devices also includes financial attributes . . .” (Ex. 1004, 6:24–44 (enumerating examples); Ex. 1002, ¶¶128–29.)

Workload Constraints: “[A]ttributes also include operating attributes of each hardware device, such as the . . . peak and average utilization percentages for each hardware device . . .” (Ex. 1004, 6:10–16; Ex. 1002, ¶¶128–29.)

Pet. 31.

Petitioner also argues that Power discloses determining additional technical, business, and workload constraints when the system receives “future hardware state criteria.” Pet. 31 (citing Ex. 1004, 9:14–43).

According to Petitioner,

[t]hese may include ‘eliminating or consolidating IT resources in individual functional categories, . . . that do not use one or more specified operating systems or databases, . . . [or] that have specified logical affinities’ (technical constraints); ‘reduction of maintenance and support staff, . . . lease or financing commitments, . . . [or] space requirements . . .’ (business constraints); and ‘target utilization percentages for each hardware device, . . . or growth allowances’ (workload constraints).

Id. at 31–32. Petitioner asserts that, because future hardware state criteria are received after the hardware survey is performed but before determining the future hardware state, they are “determined in” the compatibility analysis. *Id.* at 32 (citing Ex. 1004, Fig. 1; Ex. 1002 ¶ 130).

Petitioner further argues that source systems are selected for placement onto target systems “in accordance with” the technical, business, and workload constraints in the future hardware state criteria because Power’s compatibility analysis is optimized to ensure that the devised consolidation solutions produce targets that meet every future state criterion. *Id.* at 32 (citing Ex. 1004, 1:43–46, 1:59–62, 11:57–61; Ex. 1002 ¶ 131). Additionally, Petitioner argues that both the original and issued claims of Power disclose “placing” the sources onto the target identified in its analysis in accordance with these constraints. *Id.* at 32–33 (citing Ex. 1004, claim 5; Ex. 1019, 113).

Patent Owner argues that neither the “financial attributes” or the “future state criteria” in Power disclose the claimed “business constraints.” PO Resp. 50 (citing Ex. 2015 ¶ 188); PO Sur-reply 13–15. As to Power’s “financial attributes,” Patent Owner argues that Petitioner fails to show that the financial attributes are involved in the compatibility analysis because “Petitioner argues that the ‘financial attributes’ are collected *during* the hardware survey,” which is separate from the compatibility analysis. *Id.* at 51 (citing Pet. 18, 30–32; Ex. 2015 ¶ 189). Patent Owner also argues that Power’s financial attributes do not act as “constraints” in the compatibility analysis, and that the term “constraint” reflects “a restriction or limitation on system compatibility and placement (i.e., compatibility between or among systems). *Id.* at 52–53 (citing Ex. 2015 ¶ 191). According to Patent Owner, Power’s “financial attributes” (such as “whether the hardware device is purchased, leased, or financed” and “average costs per period for operating each hardware device”) “are just data” and do not “constrain[], limit[], or

restrict[] the placement of source systems onto target systems, as required in every challenged claim.” *Id.* at 53–54.

Patent Owner also argues that “Power’s ‘future hardware state criteria’ are not the claimed ‘business constraints’” because they are not used in an N-to-1 analysis. PO Resp. 55 (citing Pet. 28–30; Ex. 2015 ¶ 196).

Patent Owner asserts that Power uses the future hardware state criteria “in its steps 601 and 602, in which hardware devices are ‘grouped into categories based upon whether they meet all parameters indicated by the future state criteria,’ and ‘source candidates are identified . . . in order of the priority of the criteria that they do not meet,’” but “these processes necessarily fail to disclose a ‘compatibility analysis,’” let alone an N-to-1 compatibility analysis. *Id.* at 56 (citing Ex. 1004, 12:13–51; Ex. 2015 ¶¶ 198–199).

Patent Owner further argues that the analysis to pair source systems with target candidates “utilizes the hardware attributes, not future state criteria.” *Id.* at 57 (citing Ex. 1004, 13:11–12; Ex. 2015 ¶ 200). Finally, Patent Owner argues that Power’s future state criteria merely “defin[e] the *goals* of consolidating,” which are not restrictions or limitations on consolidating. *Id.* (citing Ex. 2015 ¶ 201; Ex. 1004, 9:14–43).

Petitioner responds that Power “discloses comparing business constraints of source and target systems” because it “discloses conducting a ‘survey of hardware devices [that] includes financial attributes’ and then ‘compar[ing] the [financial] attributes of the source candidate with those of each target candidate.’” Pet. Reply 13 (citing Ex. 1004, 6:25–7:13, 13:11–12). Petitioner also contends that Patent Owner’s definition of “constraint” as “a restriction or limitation on system compatibility and placement (*i.e.*, compatibility between or among systems)” is “overly limiting and

contradicts its interpretation during prosecution.” *Id.* (citing PO Resp. 52; Ex. 1022, 150:15–151:8). Petitioner argues that a “constraint” need only “impact” the placement of source systems on target systems based on Patent Owner’s statement during prosecution distinguishing a reference on the basis that it “d[id] not in any way mention business constraints or non-technical factors that **can impact** [system] placement.” *Id.* at 13–14 (citing Ex. 1003, 56 (emphasis added)).

Petitioner also argues that “Power’s financial attributes meet Patent Owner’s new definition of ‘constraint’ because “they are applied to determine which sources can be consolidated onto which targets to minimize overall costs.” Pet. Reply 14. “For example,” Petitioner contends, “a source system with expensive licensing requirements will be restricted from consolidation onto a target system that does not support the required license(s) or that would require additional purchase.” *Id.*

Based on the full trial record, we agree with Petitioner that Power discloses limitation 1[b]. Power discloses that they system conducts a survey of hardware devices to be consolidated, which includes “technical attributes of each hardware device” (Ex. 1004, 6:4–5, 5:51–6:24), “financial attributes” (*id.* at 6:24–44), and workload attributes (*id.* at 6:10–16). Power also discloses that these technical, financial, and workload attributes act as constraints, under either party’s interpretation of that term, because they are used to determine whether a source candidate can be placed on a target candidate. Ex. 1004, 13:4–52.

We do not agree with Patent Owner’s argument that Power does not disclose the use of “business constraints” in the N-to-1 consolidation analysis. First, Power discloses collecting business information in the form

of “financial attributes” during the survey of hardware devices to be consolidated:

The survey of hardware devices also includes financial attributes, such as a description of whether the hardware device is purchased, leased, financed, or other indications of ownership. Where a hardware device is leased or financed, the original and expiration dates of the lease or finance agreement are received.

Ex. 1004, 6:25–44 (emphasis added).

Power also discloses that the attributes received in the hardware survey, which include the financial attributes, are used during the N-to-1 consolidation analysis that compares sources with targets to determine whether a source candidate can be placed on a target candidate:

Once a target candidate is identified, an iterative comparison of the source candidate with each target candidate is performed, in accordance with routine 606. *This process compares the attributes of the source candidate with those of each target candidate. The attributes were received in the hardware survey, in accordance with step 101. Attributes should be prioritized, such that, if at any time an attribute does not match between the source and target candidates, the comparison process ends with the current target candidate.*

Ex. 1004, 13:8–17 (emphases added). In the portion quoted above, Power makes clear that the attributes received in the hardware survey are used during the N-to-1 analysis to determine whether a particular source can be placed on a particular target, and therefore act as constraints. As discussed in the previous quotation, these attributes received in the survey include the “financial attributes” discussed earlier. Ex. 1004, 6:25–44. Because these “financial attributes” contain business information, and because they also act as constraints in determining the placement of source systems on target systems, they are “business constraints,” as claimed.

During the hearing, Patent Owner alleged that Petitioner’s argument that Power uses “financial attributes” as part of the consolidation analysis was not raised in the Petition and was raised for the first time in the Reply. Tr. 60:4–61:2. We disagree. The Petition argues that “Power’s compatibility analysis considers technical, business and workload ‘attributes’ of the systems, which are queried during the hardware survey,” and identifies the “financial attributes” received as part of the hardware survey as the claimed “business constraints.” Pet. 30–31. Thus, we find that Petitioner’s argument that Power’s “financial attributes” act as “business constraints” was fairly raised in the Petition.

For the foregoing reasons, Petitioner has proven by a preponderance of the evidence that Power discloses limitation 1[b].

e) Summary for Claim 1

Based on the full trial record, Petitioner has proven by a preponderance of the evidence that claim 1 is anticipated by Power.

3. Independent Claims 12 and 23

Claim 12 is similar to claim 1, but recites in the preamble “[a] non-transitory computer readable medium comprising computer executable instructions for placing source systems on target systems.” Ex. 1001, 39:21–35. Petitioner argues that Power discloses computer readable storage media with program instructions. Pet. 40 (citing Ex. 1004, 3:22–26, claims 6, 10). Petitioner relies on its argument for claim 1 for the remaining limitations of claim 12.

Claim 23 is similar to claim 1, but recites in the preamble “[a] system for determining compatibility of computer systems for placing source systems on target systems, the memory comprising computer executable

instructions for operating the system.” Ex. 1001, 40:16–31. Petitioner argues that Power discloses a system with a processor and memory. Pet. 41 (citing Ex. 1004, claims 1, 6, 10). Petitioner relies on its argument for claim 1 for the remaining limitations of claim 23.

Patent Owner does not present separate arguments for claims 12 and 23. PO Resp. 32–58.

We agree with Petitioner that Power discloses the use of a processor and memory in the form of computer readable storage media with program instructions.⁵ We also find that Power discloses the remaining limitations of claims 12 and 23 for the reasons discussed above with respect to claim 1. *See* § II.D.2, *supra*.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claims 12 and 23.

4. Dependent Claim 2

Claim 2 depends from claim 1, and further recites “generating a plurality of potential workload placement solutions; and selecting an optimal workload placement solution, from the plurality of potential workload placement solutions.” Ex. 1001, 38:49–53.

Petitioner argues that “Power teaches that when a source candidate is found compatible with a target with respect to certain attributes, the target is added to ‘Match List[s]’ corresponding to each attribute on which the two are compatible.” Pet. 33 (citing Ex. 1004, 13:18–36). “The match lists for a given source-target pair,” according to Petitioner, “constitute a potential

⁵ Because we are persuaded that Petitioner has shown that Power teaches the subject matter recited in the preambles of claims 12 and 23, we need not decide whether the preambles are limiting.

workload placement solution.” *Id.* Petitioner asserts that, “[o]nce this process has been performed for all target candidates, the match list(s) corresponding to different targets ‘are reviewed to determine the extent to which any target candidate matches the source candidate’s attributes.’” *Id.* (citing Ex. 1004, 13:37–63). Petitioner contends that “[t]he target with the highest number of matches that can also ‘accommodate the physical and logical usage of the source candidate’ is selected as the optimal workload placement solution.” *Id.* at 33–34 (citing Ex. 1004, 13:37–63; Ex. 1002 ¶¶ 134–35). Alternatively, Petitioner argues that “Power discloses that ‘a point system may be used,’ wherein ‘[t]he target candidate having the highest point total and the requisite physical and logical capacities would then be matched to the source candidate.” *Id.* at 34 (citing Ex. 1004, 14:24–30).

Patent Owner does not present separate argument for claim 2. PO Resp. 32–58.

We agree with Petitioner that Power’s match lists for a given source-target pairs are potential workload placement solutions. We also agree that Power’s review of the match lists to determine the target with the highest number of matches that can accommodate a source is a selection of an optimal workload placement solution. We further agree that Power’s use of a point system also discloses selecting the optimal workload solution based on the number of compatibility points and available target capacity.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 2.

5. *Dependent Claim 3*

Claim 3 depends from claim 2 and further recites that “the optimal workload placement solution is selected according to one or more criteria, the one or more criteria comprising at least one of a compatibility score, and a number of transfers.” Ex. 1001, 38:54–57.

Petitioner argues that, in addition to using a point system (a “compatibility score”) as discussed with respect to claim 2, “[t]he optimal workload placement solution can also be selected based on a number of transfers.” Pet. 34. Petitioner contends that “Power teaches that the user can provide the system a ‘physical consolidation ratio comparing the number of current hardware devices to the target number of hardware devices after consolidation.’” *Id.* (citing Ex. 1004, 7:16–26). According to Petitioner, “Power also discloses that the consolidation ratio can be received as a range, ‘which extends from the most conservative acceptable consolidation ratio to the most aggressive acceptable consolidation ratio.’” *Id.* at 35 (citing Ex. 1004, 7:40–44, 7:49–54). “Because the sources and targets analyzed by Power are all physical machines,” Petitioner asserts, “and the number of systems to be analyzed is known before the analysis begins, the number of transfers a consolidation solution needs to achieve the desired consolidation ratio is fixed.” *Id.*

Petitioner further argues that, in Power, “[s]ources and targets are compared for consolidation in furtherance of achieving a consolidation ratio or range of ratios.” *Id.* “In particular,” according to Petitioner, “if the most aggressive acceptable ratio has already been achieved, then a proposed workload placement solution will not be selected.” *Id.* (citing Ex. 1004, 7:40–47). “Therefore,” Petitioner contends, “an optimal workload

placement solution is selected ‘according to’ a desired number of transfers in the form of a consolidation ratio.” *Id.* (citing Ex. 1002 ¶¶ 140–41).

Patent Owner does not present separate argument for claim 3. PO Resp. 32–58.

We agree with Petitioner that Power discloses that the optimal workload placement solution may be selected based on a number of transfers to achieve the physical consolidation ratio provided by the user. Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 3.

6. Dependent Claim 4

Claim 4 depends from claim 1, and further recites “ranking a plurality of target systems as candidates to host one or more source workloads according to compatibility scores and a resultant target resource utilization and selecting a best candidate.” Ex. 1001, 38:58–62.

Petitioner argues that “Power ranks a plurality of targets as host candidates for one or more source workloads.” Pet. 36 (citing Ex. 1004, 3:66–4:2). Petitioner relies on Power’s disclosure that

“[o]nce a target candidate is identified, an iterative comparison of the source candidate with each target candidate is performed, in accordance with routine 606. This process compares the attributes of the source candidate with those of the target candidate.”

Pet. 36 (quoting Ex. 1004, 13:7–12).

Petitioner argues that “[t]hese attributes are compared in priority order, and if a source and target are compatible based on a particular attribute, the target is added to a ‘match list’ for that attribute.” Pet. 36. “For each source system,” Petitioner contends, “targets are ranked according to the match lists they appear on, where targets on match list N have greater

compatibility than the ones on match list N+1 because attribute N is considered more important than attribute N+1.” *Id.* (citing Ex. 1001, 13:18–63). According to Petitioner, “[t]his process constitutes ‘ranking,’” and the ranking can rely on the point system, or compatibility score, in which “‘each target candidate is given a pre-defined number for each of its attributes that match the source candidate,’” with “‘the number of points per attribute . . . varied to reflect priority.’” *Id.* (quoting Ex. 1004, 14:24–30; citing Ex. 1002 ¶¶ 142–145). Petitioner also argues that Power discloses that “[t]he expected resource utilization of a target candidate is checked during the ranking to ensure that the target has sufficient capacity to receive the source system before the systems are matched.” *Id.* (citing Ex. 1004, 13:45–52, 14:28–30).

Patent Owner does not present separate argument for claim 4. PO Resp. 32–58.

We agree with Petitioner that Power discloses ranking target systems as candidates to host source workloads according to compatibility scores and resultant target resource allocation. Specifically, we agree with Petitioner that Power discloses that targets are ranked according to the match lists they appear on, and that this ranking can rely on the point system or compatibility score identified in claim 4. We also agree with Petitioner that Power discloses selecting a best candidate based on this ranking.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 4.

7. Dependent Claim 5

Claim 5 depends from claim 1, and further recites that “at least one compatibility parameter relates to the presence of licensed software, the

method further comprising determining a combination of workloads running particular software applications that when combined onto the target system minimizes the software licensing costs.” Ex. 1001, 38:63–68.

Petitioner argues that “Power discloses calculating ‘a cost savings that will be realized from consolidating the hardware devices,’ (Ex. 1004, 7:16–17), which considers an average cost per period that ‘represent[s] all cost variables for operating hardware devices over a time period, including . . . costs from operating system licensing and updating.’” Pet. 37 (citing Ex. 1004, 6:33–37, 7:56–8:5). “The ‘average cost per period’” according to Petitioner, “is a parameter that relates to the presence of licensed software, which is used during the compatibility analysis to determine how much the costs of operating the systems (including licensing the software) will be reduced through a proposed system consolidation.” *Id.* (citing Ex. 1002 ¶¶ 146–148).

Patent Owner does not present separate argument for claim 5. PO Resp. 32–58.

We agree with Petitioner that Power considers, as a compatibility parameter, the savings in cost from operating system licensing that would be achieved by the consolidation. We also agree that, by using this parameter, Power discloses determining a combination of workloads running particular operating systems software that, when combined on the target, will minimize licensing costs.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 5.

8. *Dependent Claim 9*

Claim 9 depends from claim 1 and further recites “determining at least one optimal combinations of applications operable independently on the target system.” Ex. 1001, 39:12–14.

Petitioner argues that “Power discloses a consolidation analysis for applications that is similar to its system consolidation method,” relying on the following disclosure from Power:

In conjunction with the future hardware state, a future state for applications may also be determined and returned, in accordance with step 109. The future application state comprises the projected distribution of applications among all hardware devices after consolidation. The future application state identifies . . . which target hardware, if any, will receive the application or its replacement.

Pet. 38 (citing Ex. 1004, 10:36–48).

According to Petitioner, “Power considers information from an ‘application survey,’ including ‘the name and version of each application’ and its ‘primary function.’” Pet. 38 (citing Ex. 1004, 8:41–55, 9:56–58). Petitioner also asserts that Power “considers ‘application replacement criteria,’ such as which applications are nearing the end of their lifespans and any other ‘choices of applications’ submitted by the user, to determine the optimal combination of applications in the future application state.” *Id.* (citing Ex. 1004, 9:44–58).

Additionally, Petitioner argues that “[t]he Power analysis identifies a configuration in which applications are operable *independently* on the target system because it considers ‘application attributes that impact the consolidation of a particular application with others’ to avoid incompatibilities.” Pet. 38 (citing Ex. 1004, 8:56–66). According to Petitioner, “[c]onsidering these attributes ensures that applications on the

target system that originate from one source system will be able to run without interfering with applications that originated from other source(s).” *Id.* at 38–39 (citing Ex. 1002 ¶ 151). Petitioner further argues that “[t]he applications are also operable independently because when a source is paired with a target in Power’s compatibility analysis,” Power “updates the target’s capacity ‘to reflect the effect of migrating the source candidate’s applications to the target candidate’ to ensure that the target system will be able to accommodate the workloads of all the applications consolidated onto it.” *Id.* at 39 (citing Ex. 1004, 14:7–11; Ex. 1002 ¶ 151).

Patent Owner does not present separate argument for claim 9. PO Resp. 32–58.

We agree with Petitioner that Power discloses a consolidation analysis for applications, and that this analysis determines an optimal combination of applications operating on the target system. We also agree that these applications would operate “independently” because the system considers during consolidation attributes that would avoid incompatibilities between applications.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 9.

9. Dependent Claim 10

Claim 10 depends from claim 9, and further recites that “the optimal combination of applications coexist in the same operating system environment.” Ex. 1001, 39:15–17. Petitioner argues that, “[b]ecause Power discloses ‘placing’ the source systems, which contain the optimal combination of applications, onto the target systems under claim 1 (*supra*, 30–33), the optimal combination of applications coexist in the operating

system environment of the target system.” Pet. 39 (citing Ex. 1002 ¶¶ 153–155). Patent Owner does not present separate argument for claim 9. PO Resp. 32–58.

We agree with Petitioner that Power’s disclosure of “placing” the source systems (with the optimal combination of applications) on the target system (as discussed above for claim 1) also discloses that the optimal combination of applications would coexist in the target system’s operating system environment.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 10.

10. Dependent Claim 11

Claim 11 depends from claim 9, and further recites that “the optimal combination of applications is determined using a multi-dimensional analysis of inter-compatibility between a plurality of workloads and the target system.” Ex. 1001, 39:18–21.

Petitioner argues that Power’s N-to-1 analysis “determines the intercompatibility of multiple sources (and their workloads) and a target system.” Pet. 39–40 (citing Ex. 1004, 30:5–8). Patent Owner also argues that “compatibility is analyzed according to multiple dimensions or ‘attributes.’” *Id.* at 40 (citing Ex. 1004, 13:18–30 (describing compatibility attributes P(1), P(2), . . . , P(x)); Ex. 1002 ¶¶ 156–59). According to Petitioner, Power also “discloses that the future application state, which identifies the optimal combination of applications under claim 9, ‘preferably complies with the source-target combinations determined in the future hardware state’ using this compatibility analysis.” *Id.* (citing Ex. 1004, 10:45–47).

Patent Owner does not present separate argument for claim 10. PO Resp. 32–58.

We agree with Petitioner that Power discloses that the N-to-1 compatibility analysis determines compatibility according to multiple dimensions or “attributes,” and that this would apply to situations where an optimal combination of applications were determined for the target system, as discussed for claims 9 and 10.

Consequently, Petitioner has proven by a preponderance of the evidence that Power anticipates claim 11.

11. Dependent Claims 13–16 and 20–22

Dependent claims 13–16 and 20–22 recite substantially the same limitations as claims 2–5 and 9–12. Petitioner relies on its arguments for claims 2–5 and 9–12 for these claims. Pet. 41. Patent Owner does not present separate argument for these claims. PO Resp. 32–58.

For the reasons discussed above with respect to claims 2–5 and 9–12, Petitioner has proven by a preponderance of the evidence that Power anticipates claims 13–16 and 20–22.

12. Dependent Claims 24–27 and 31–33

Dependent claims 24–27 and 31–33 recite substantially the same limitations as claims 2–5, 9–11, and 23. Petitioner relies on its arguments for claims 2–5, 9–11, and 23 for these claims. Pet. 42. Patent Owner does not present separate argument for these claims. PO Resp. 32–58.

For the reasons discussed above with respect to claims 2–5, 9–11, and 23, Petitioner has proven by a preponderance of the evidence that Power anticipates claims 24–27 and 31–33.

E. Ground 2: Obviousness of Claims 1–33 Over Power and Kerr

Petitioner contends that claims 1–33 are unpatentable as obvious over the combined teachings of Power and Kerr. Pet. 42–53. Patent Owner does not separately argue this ground, but instead relies on the alleged deficiencies of Power discussed for Ground 1. PO Resp. 32–58. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that the claims challenged in this ground are unpatentable over Power and Kerr.

1. Overview of Kerr (Ex. 1006)

Kerr describes PowerConvert, a system “for converting machines from one form to another” including moving a virtual machine to a physical machine or vice versa. Ex. 1006, code (57), 2:50–51. A physical to virtual machine conversion is referred to as a “P2V” conversion. *Id.* at 2:21–22, Fig. 1. Kerr defines PowerConvert as “a fully automated solution for OS portability” that “can move the entire contents of a machine, including its operating system applications and data to another machine.” *Id.* at 4:1–4.

2. Analysis of Independent Claim 1

With respect to claim 1, Petitioner relies on Power for the preamble and elements 1[a1]–1[a2], and presents the same arguments as it did for Ground 1. Pet. 44–45.

For element 1[b], Petitioner relies on its argument for Ground 1, and also argues that, to the extent Power does not disclose “placing the source systems onto the target systems,” Kerr includes such a disclosure. Pet. 45–46. Petitioner asserts that both Power and Kerr demonstrate that one of ordinary skill would have understood that “technologies allow for single hardware devices to operate as multiple virtual machines.” *Id.* at 45 (citing

Ex. 1004, 1:48–52; Ex. 1006, 2:15–16). Petitioner further contends that, “because Power’s iterative consolidation analysis contemplates consolidating multiple source systems onto a single target system,” one of ordinary skill “would have looked to use P2V conversion to place multiple source systems on the target.” *Id.* (citing Ex. 1004, 11:53–57, 14:7–18; Ex. 1002 ¶ 187).

Petitioner argues that one of ordinary skill “would have been motivated to leverage Kerr’s PowerConvert utility to create and place VMs containing the workloads of the source systems onto the corresponding targets specified in the future hardware state of Power.” Pet. 46 (citing Ex. 1002 ¶ 189). According to Petitioner, “[b]oth Power and Kerr emphasize the importance of optimizing the use of computing resources in a distributed environment.” *Id.* (citing Ex. 1004, 1:33–65, 11:53–57; Ex. 1006, 1:23–25). One of ordinary skill, Petitioner contends, “would understand that performing the consolidation(s) proposed by Power would result in more efficient use of the systems and would look to use a conversion and migration tool to ‘provide optimal use of the servers.’” *Id.* (citing Ex. 1006, 1:23–25).

Petitioner also argues that “[t]he fully automated nature of PowerConvert would have provided further motivation for a [person of ordinary skill in the art] to use it to consolidate the systems,” rather than using a manual process, because using PowerConvert “would achieve significant efficiencies, such as reduced administrative costs, faster consolidations, reduced server downtime, and fewer opportunities for human error.” *Id.* at 46–47 (citing Ex. 1006, 1:25–35; Ex. 1002 ¶ 190). Additionally, Petitioner contends, one of ordinary skill “would have had a

reasonable expectation of success combining Power and Kerr” because “[v]irtual machine technology was widely used at the priority date of the ’492 patent, and a [person of ordinary skill in the art] would have been able to perform the minimal setup needed to connect the source and target systems to PowerConvert.” *Id.* at 47 (citing Ex. 1004, 9:60–65, 3:43–47; Ex. 1002 ¶ 191).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments concerning Power for limitation 1[b] in Ground 1. PO Resp. 32–58.

As discussed in Section II.D.2 above, we find that Power discloses all of the limitations of claim 1. We also agree with Petitioner that Kerr discloses placing source systems onto target systems in an automated utility (PowerConvert). We further agree that one of ordinary skill would have found it obvious to use Kerr’s automated utility for Power’s consolidation in order to improve the efficiency of the conversion process, and that one of ordinary skill would have had a reasonable expectation of success in making the combination due to the knowledge of virtual machine technology as of the priority date of the ’492 patent.

Consequently, for the reasons set forth above, as well as those discussed in Section II.D.2, Petitioner has proven by a preponderance of the evidence that claim 1 would have been obvious over the combination of Power and Kerr.

3. Dependent Claim 3

Claim 3 depends from claim 2, and further recites that “the optimal workload placement solution is selected according to one or more criteria,

the one or more criteria comprising at least one of a compatibility score, and a number of transfers.” Ex. 1001, 38:54–57. Petitioner argues that

[t]o the extent Power is not found to disclose consolidation based on a number of transfers under Ground 1, it would have been obvious to a [person of ordinary skill in the art] as of the priority date of the ’492 patent to allow a user to specify a desired number of transfers rather than a desired consolidation ratio in order to afford the user the ability to specify the desired number of transfers directly.

Pet. 47 (citing Ex. 1002 ¶¶ 193–95). “Because a number of transfers is functionally equivalent to the consolidation ratio,” Petitioner contends, a person of ordinary skill “would have had a reasonable expectation of success implementing this feature in the Power method.” *Id.* at 47–48.

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 3. PO Resp. 32–58.

We agree that, even if Power did not disclose consolidation based on a number of transfers, it would have been obvious to allow a user to specify a desired number of transfers rather than a desired consolidation ratio, because doing so would allow the user to specify the desired number of transfers directly. We also agree that one of ordinary skill would have had a reasonable expectation of success in implementing this feature in Power.

Consequently, Petitioner has proven by a preponderance of the evidence that claim 3 would have been obvious over the combination of Power and Kerr.

4. Dependent Claim 6

Claim 6 depends from claim 1, and further recites “determining at least one optimal combination of workloads corresponding to virtual machines operable on the target system.” Ex. 1001, 39:1–3.

Petitioner argues that “[c]ombining Power and Kerr as described in claim 1 to satisfy the ‘placing’ requirement of claim element 1[b] with the VMs created using Kerr satisfies the additional limitations of claim 6.” Pet. 48 (citing Ex. 1002 ¶¶ 196–197). According to Petitioner, “[t]he workloads identified for consolidation by Power constitute an ‘optimal combination’ because they satisfy constraints of the compatibility analysis.” *Id.* (citing Ex. 1002 ¶¶ 196–197).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 6. PO Resp. 32–58.

We agree with Petitioner that Power discloses determining an “optimal combination” of workloads because those workloads are based on the priority constraints used in the compatibility analysis. We also agree that the combination with Kerr’s VMs teaches that the workloads correspond to virtual machines operable on the target system.

Consequently, Petitioner has proven by a preponderance of the evidence that claim 6 would have been obvious over the combination of Power and Kerr.

5. Dependent Claim 7

Claim 7 depends from claim 6, and further recites that “a virtual machine corresponds to an abstraction of a physical system, enabling an

operating system to be independently installed on each virtual system residing on a same physical system.” Ex. 1001, 39:4–7.

Petitioner argues that “[t]his claim adds nothing more than a description of ordinary virtualization,” and that “Power discloses knowledge of virtualization.” Pet. 48 (citing Ex. 1004, 1:48–50, 5:55–58). Based on these disclosures, Petitioner contends, one of ordinary skill “would have understood “that a target running the virtual machines configured in claim 6 could be made to accommodate VMs that each have an independent operating system image, as is typical when running a server that hosts multiple VMs.” *Id.* at 49 (citing Ex. 1002 ¶ 199). Petitioner further argues that, “[t]o the extent Power does not explicitly disclose this claim, it is disclosed by Kerr,” which “teaches that “[v]irtual machines 14 emulate a specific environment and run on virtual machine server software,” that “multiple virtual machines 14 may be deployed on a physical machine 10,” and that “each VM is loaded with its own OS.” *Id.* (citing Ex. 1006, 2:8–16, Table 1). According to Petitioner, it would have been obvious to a person of ordinary skill “to apply these fundamental teachings about VMs to Power to facilitate the consolidation, while maintaining isolation between systems whose applications and data otherwise would not be combinable.” *Id.* (citing Ex. 1002 ¶¶ 200–202).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 7. PO Resp. 32–58.

We agree with Petitioner that this claim is a description of ordinary virtualization. We also agree that Kerr discloses a virtualization in which a virtual machine corresponds to an abstraction of a physical system, and that

this enables an operating system to be independently installed on each virtual system residing on the same physical system.

Consequently, Petitioner has proven by a preponderance of the evidence that claim 7 would have been obvious over the combination of Power and Kerr.

6. Dependent Claim 8

Claim 8 depends from claim 6, and further recites that “a virtual machine corresponds [to] a logical subdivision of an operating system installed on a physical system, enabling isolation in operation without executing a different operating system.” Ex. 1001, 39:8–11.

Petitioner argues that, like claim 7, claim 8 “merely describes ordinary virtualization.” Pet. 50 (citing Ex. 1002 ¶¶ 198–203). Petitioner contends that “Power discloses that the ‘[l]ogical capacities’ of a physical system ‘may comprise, for example, the total and available number of operating system images or *partitions* that may be operated on a device.’” *Id.* (citing Ex. 1004, 5:55–58 (emphasis added)). According to Petitioner, “[a] partition is a logical subdivision of an operating system.” *Id.* (citing Ex. 1002 ¶ 204). Petitioner argues that one of ordinary skill “would understand that a server could be configured to house one virtual system created by Kerr’s PowerConvert utility on each partition of the server’s operating system, and would understand that OS partitions are isolated from one another.” *Id.*

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 8. PO Resp. 32–58.

We agree with Petitioner that this claim describes an aspect of ordinary virtualization, and that this aspect of virtualization (a virtual

machine corresponding to a logical subdivision of an operating system on a physical system that enable isolation without executing a different operating system) would have been obvious to one of ordinary skill based on Power and Kerr.

Consequently, Petitioner has proven by a preponderance of the evidence that claim 8 would have been obvious over the combination of Power and Kerr.

7. Dependent Claim 9

Claim 9 depends from claim 1, and further recites “determining at least one optimal combination of applications operable independently on the target system.” Ex. 1001, 39:12–14.

Petitioner argues that Power discloses claim 9, and that Power and Kerr further disclose “that the applications operate ‘independently’ on the target system because each consolidated system retains its original operating system and application load.” Pet. 50 (citing Ex. 1002 ¶¶ 206–207).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 9. PO Resp. 32–58.

We agree with Petitioner that the combination of Power and Kerr teaches having each consolidated system retain its original operating system and application load. Consequently, Petitioner has proven by a preponderance of the evidence that claim 9 would have been obvious over the combination of Power and Kerr.

8. *Dependent Claim 10*

Claim 10 depends from claim 9, and further recites that “the optimal combination of applications coexist in a same operating system environment.” Ex. 1001, 39:15–17.

Petitioner argues that Power in view of Kerr discloses claim 10 because “Kerr discloses creating a system configuration in which multiple VMs running client applications operate independently in the same operating system environment.” Pet. 51 (citing Ex. 1002 ¶ 209; Ex. 1006, Fig. 4, 2:7–16). “Thus,” according to Petitioner, “the VMs created from the source systems of claim 1 using Kerr—which together contain an optimal combination of applications—could be placed on the target such that their applications coexist in the same host OS environment—the VMM.” *Id.* (citing Ex. 1002 ¶¶ 209–210). Petitioner argues that one of ordinary skill “would have a reasonable expectation of success combining this embodiment of Kerr with Power for the reasons provided above with respect to claim 1.” *Id.* (citing Ex. 1002 ¶ 210).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 10. PO Resp. 32–58.

We agree with Petitioner that the combination of Power and Kerr teaches this limitation because Power discloses generating an optimal combination of applications, and the combination of Power and Kerr teaches having such a combination exist in the same operating system environment. Consequently, Petitioner has proven by a preponderance of the evidence that claim 10 would have been obvious over the combination of Power and Kerr.

9. Dependent Claim 11

Claim 11 depends from claim 9, and further recites that “the optimal combination of applications is determined using a multi-dimensional analysis of intercompatibility between a plurality of workloads and the target system.” Ex. 1001, 39:18–21. Petitioner argues that, as discussed above, Power in view of Kerr teaches claim 9 and, as discussed for claim 1, Power discloses the additional limitations of claim 11. Pet. 51–52 (citing Ex. 1002 ¶¶ 212–213).

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claim 11. PO Resp. 32–58.

For the reasons discussed above with respect to claims 1 and 9, Petitioner has proven by a preponderance of the evidence that claim 11 would have been obvious over the combination of Power and Kerr. *See* §§ II.D.2, II.E.7, *supra*.

10. Independent Claims 12 and 23

Petitioner relies on its arguments for claim 1 and Ground 1 for independent claims 12 and 23. Pet. 52–53. Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power for claims 12 and 23. PO Resp. 32–58. For the reasons discussed above with respect to claim 1, Petitioner has proven by a preponderance of the evidence that claims 12 and 23 would have been obvious based on the combination of Power and Kerr. *See* §§ II.D.3, II.E.2, *supra*.

11. Dependent Claims 14, 17–22, 25, and 28–33

For claims 14, 17–22, 25, and 28–33, Petitioner relies on its arguments for claims 3, 6–12, and 23.

Patent Owner does not present specific argument directed to the combination of Power and Kerr, and relies on its arguments in Ground 1 concerning Power. PO Resp. 32–58. For the reasons discussed above with respect to claims 3, 6–12, and 23, Petitioner has proven by a preponderance of the evidence that claims 14, 17–22, 25, and 28–33 would have been obvious based on the combination of Power and Kerr.

12. Dependent Claims 2, 4–5, 13, 15–16, 24, and 26–27

For claims 2, 4–5, 13, 15–16, 24, and 26–27, Petitioner relies on its arguments for Ground 1. Patent Owner does not present specific argument directed to these claims in Ground 2. PO Resp. 32–58. For the reasons discussed above in Ground 1, Petitioner has proven by a preponderance of the evidence that claims 2, 4–5, 13, 15–16, 24, and 26–27 would have been obvious based on the combination of Power and Kerr. *See* § II.D, *supra*.

F. Remaining Grounds

As discussed above in §§ II.D and II.E Petitioner has proven unpatentability of all of challenged claims 1–33 under Ground 1 based on Power and/or Ground 2 based on Power and Kerr. Therefore, we need not address Ground 3 based on Van Hoose and Le in this proceeding. 35 U.S.C. § 318(a) (“If an inter partes review is instituted and not dismissed under this chapter, the Patent Trial and Appeal Board shall issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d).”); *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018) (holding that a petitioner “is

entitled to a final written decision addressing all of the claims it has challenged”); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (“We agree that the Board need not address issues that are not necessary to the resolution of the proceeding.”).

III. CONCLUSION⁶

For the reasons discussed above, Petitioner has proven, by a preponderance of the evidence, that the challenged claims are unpatentable, as summarized in the following table:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–5, 9–16, 20–27, 31–33	102(e)	Power	1–5, 9–16, 20–27, 31–33	
1–33	103(a)	Power, Kerr	1–33	
1–33	103(a)	Van Hoose, Le ⁷		
Overall Outcome			1–33	

⁶ 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).

⁷ As explained above, because we find that claims 1–33 are unpatentable on other grounds, we decline to address those claims in this ground.

IV. ORDER

Accordingly, it is

ORDERED that claims 1–33 of the '492 patent have been shown, by a preponderance of the evidence, to be unpatentable; and

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.

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FOR PETITIONER:

Mehran Arjomand
Richard S.J. Hung
Matthew I. Kreeger
Diek O. Van Nort
Alex S. Yap
Stephen Liu
MORRISON & FOERSTER LLP
marjomand@mofo.com
rhung@mofo.com
mkreeger@mofo.com
dvannort@mofo.com
ayap@mofo.com
sliu@mofo.com

FOR PATENT OWNER:

Khue V. Hoang
Philip Eklem
Christine E. Lehman
Michael G. Flanigan
REICHMAN JORGENSEN LLP
khoang@reichmanjorgensen.com
peklem@reichmanjorgensen.com
clehman@reichmanjorgensen.com
mflanigan@reichmanjorgensen.com