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Paper 111
Entered: March 23, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACTIVISION BLIZZARD, INC.,
ELECTRONIC ARTS INC.,
TAKE-TWO INTERACTIVE SOFTWARE, INC.,
2K SPORTS, INC., ROCKSTAR GAMES, INC., and
BUNGIE, INC.,
Petitioner,

v.

ACCELERATION BAY, LLC,
Patent Owner.

Case IPR2015-01972[1]
Patent 6,701,344 B1

Before SALLY C. MEDLEY, LYNNE E. PETTIGREW, and WILLIAM M. FINK, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

FINAL WRITTEN DECISION[2]
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

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[1] Bungie, Inc., who filed a Petition in IPR2016-00934, has been joined as a petitioner in this proceeding.

[2] A sealed "Parties and Board Only" version of this Decision was entered on March 23, 2017. Pursuant to notice from the parties that this Decision may be made publicly available without any redactions, the Decision is reissued as a public version.

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Activision Blizzard, Inc., Electronic Arts Inc., Take-Two Interactive Software, Inc., 2K Sports, Inc., Rockstar Games, Inc., and Bungie, Inc. (collectively, "Petitioner") challenge claims 1–11 and 16–19 ("the challenged claims") of U.S. Patent No. 6,701,344 B1 (Ex. 1101, "the '344 patent"), owned by Acceleration Bay, LLC ("Patent Owner"). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable.

A. Procedural History

Activision Blizzard, Inc., Electronic Arts Inc., Take-Two Interactive Software, Inc., 2K Sports, Inc., and Rockstar Games, Inc., filed a Petition for *inter partes* review of claims 1–19 of the '344 patent. Paper 2 ("Pet."). Patent Owner filed a Preliminary Response. Paper 6 ("Prelim. Resp."). On March 24, 2016, we instituted an *inter partes* review of claims 1–11 and 16–19 of the '344 patent on the ground of obviousness under 35 U.S.C. § 103(a)[3] over Shoubridge.[4] Paper 8, 23 ("Dec.").

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[3] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '344 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

[4] Peter J. Shoubridge & Arek Dadej, *Hybrid Routing in Dynamic Networks*, 3 IEEE INT'L CONF. ON COMMS. CONF. REC. 1381-86 (Montreal, 1997) (Ex. 1105) ("Shoubridge").

Subsequent to institution, Bungie, Inc. filed a Petition and Motion for Joinder with the instant proceeding. *Bungie, Inc. v. Acceleration Bay, LLC*, IPR2016-00934, Papers 2, 3. On July 8, 2016, we instituted an *inter partes* review and granted the Motion, joining Bungie, Inc. as a petitioner in this *inter partes* review. Paper 26.

Thereafter, Patent Owner filed a Patent Owner Response ("PO Resp."). Paper 31 (confidential), Paper 103 (redacted). Petitioner filed a Reply to the Patent Owner Response ("Pet. Reply"). Paper 59. Patent Owner also filed a Contingent Motion to Amend requesting substitution of various claims in the event certain claims in the '344 patent were found to be unpatentable. Paper 32 ("Mot. Am."). Petitioner filed an Opposition to Patent Owner's Contingent Motion to Amend. Paper 57 ("Opp. Mot. Am."). Patent Owner then filed a Reply in support of its Contingent Motion to Amend. Paper 72 ("Reply Mot. Am."). Patent Owner also filed a Motion for Observation on Cross-Examination. Paper 80 ("Mot. Obsv."). Petitioner filed a Response to Petitioner's Motion for Observation. Paper 89 ("Resp. Obsv.")

An oral hearing was held on December 7, 2016.[5] A transcript of the hearing has been entered into the record. Paper 102 ("Tr.").

B. Related Matters

Petitioner identifies the following pending judicial matters as relating to the '344 patent: *Activision Blizzard, Inc. v. Acceleration Bay LLC*, Case No. 3:16-cv-03375 (N.D. Cal., filed June 16, 2016); *Electronic Arts Inc. v.*

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[5] A consolidated hearing was held for this proceeding and IPR2015-01951, IPR2015-01953, IPR2015-01964, IPR2015-01970, and IPR2015-01996. *See* Paper 84 (hearing order).

Acceleration Bay LLC, Case No. 3:16-cv-03378 (N. D. Cal., filed June 16, 2016); *Take-Two Interactive Software, Inc. v. Acceleration Bay LLC*, Case No. 3:16-cv-03377 (N.D. Cal., filed June 16, 2016); *Acceleration Bay LLC v. Activision Blizzard, Inc.*, Case No. 1:16-cv-00453 (D. Del., filed June 17, 2016); *Acceleration Bay LLC v. Electronic Arts Inc.*, Case No. 1:16-cv-00454 (D. Del., filed June 17, 2016); and *Acceleration Bay LLC v. Take-Two Interactive Software, Inc.*, Case No. 1:16-cv-00455 (D. Del., filed June 17, 2016). Paper 20, 2–3.

Petitioner and Patent Owner also identify five other petitions for *inter partes* review filed by Petitioner challenging the ’344 patent and similar patents: IPR2015-01970 (the ’344 patent); IPR2015-01951 and IPR2015-01953 (U.S. Patent No. 6,714,966 B1); and IPR2015-01964 and IPR2015-01996 (U.S. Patent No. 6,829,634 B1). Pet. 4; Paper 5, 1. Trials were instituted in those proceedings as well.

C. The ’344 Patent

The ’344 patent relates to a “broadcast technique in which a broadcast channel overlays a point-to-point communications network.” Ex. 1101, 4:3–5. The broadcast technique overlays the underlying network system with a graph of point-to-point connections between host computers or nodes through which the broadcast channel is implemented. *Id.* at 4:23–26. Figure 1 of the ’344 patent is reproduced below:

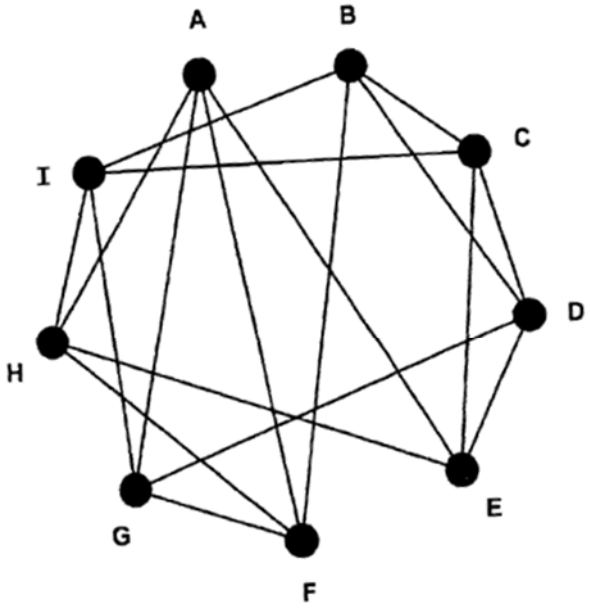

Fig. 1

Figure 1 illustrates a broadcast channel represented by a "4-regular, 4-connected" graph. *Id.* at 4:48–49. The graph of Figure 1 is "4-regular" because each node is connected to exactly four other nodes (e.g., node A is connected to nodes E, F, G, and H). *Id.* at 4:38–39, 4:49–53. A node in a 4-regular graph can only be disconnected if all four of the connections to its neighbors fail. *Id.* at 4:39–42. Moreover, the graph of Figure 1 is "4-connected" because it would take the failure of four nodes to divide the graph into two separate sub-graphs (i.e., two broadcast channels). *Id.* at 4:42–47.

To broadcast a message over the network, an originating computer sends the message to each of its four neighbors using the point-to-point connections. *Id.* at 4:30–32. Each computer that receives the message sends it to its other neighbors, such that the message is propagated to each computer in the network. *Id.* at 4:32–38. The minimum number of

connections needed to traverse any two computers in the network is known as the "distance" between them, while the maximum of the distances in the network is called the "diameter" of the broadcast channel. *Id.* at 4:57–5:3. In Figure 1, the diameter is 2 because a message originating at any node (e.g., A) traverses no more than 2 connections to reach every other node. *Id.* at 5:3–6.

In one embodiment described in the '344 patent, a distributed game environment is implemented using broadcast channels. *Id.* at 16:30–31. Each player's computer executes a game application program, and a player joins a game by connecting to the broadcast channel on which the game is played. *Id.* at 16:31–36. Each time a player takes an action in the game, a message representing that action is broadcast on the game's broadcast channel. *Id.* at 16:36–38.

D. Illustrative Claim

Among the claims of the '344 patent at issue in this proceeding, claims 1, 16, and 18 are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A computer network for providing a game environment for a plurality of participants, each participant having connections to at least three neighbor participants, wherein an originating participant sends data to the other participants by sending the data through each of its connections to its neighbor participants and wherein each participant sends data that it receives from a neighbor participant to its other neighbor participants, further wherein the network is m-regular, where m is the exact number of neighbor participants of each participant and further wherein the number of participants is at least two greater than m thus resulting in a non-complete graph.

Id. at 29:26–37.

II. DISCUSSION

A. Principles of Law

To prevail in its challenge to Patent Owner's claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The level of ordinary skill in the art may be reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

B. Level of Ordinary Skill in the Art

Citing its declarant, Dr. David R. Karger, Petitioner contends that a person having ordinary skill in the art at the time of the invention would have had a minimum of (1) a bachelor's degree in computer science, computer engineering, applied mathematics, or a related field of study; and (2) four or more years of industry experience relating to networking protocols or network topologies. Pet. 15; Ex. 1119 ¶ 19. Petitioner also contends that additional graduate education could substitute for professional

experience, or significant experience in the field could substitute for formal education. Pet. 15–16; Ex. 1119 ¶ 19.

Patent Owner's expert, Dr. Michael Goodrich, opines that a person of ordinary skill in the art would have had (1) a bachelor's degree in computer science or related field, and (2) two or more years of industry experience and/or an advanced degree in computer science or related field. Ex. 2022 ¶ 25. Dr. Goodrich also states that his opinions would be the same if rendered from the perspective of a person of ordinary skill in the art as set out by Dr. Karger. *Id.* ¶ 28.

The levels of ordinary skill proposed by the parties do not differ significantly, as suggested by Dr. Karger's testimony that his opinions would be the same under either party's proposal. *See id.* Both parties' proposed descriptions require at least an undergraduate degree in computer science or related technical field, and both require at least two years of industry experience (although Petitioner proposes four years), but both agree that an advanced degree could substitute for work experience. For purposes of this Decision, we adopt Petitioner's proposed definition as more representative, but note that our analysis would be the same under either definition.

C. Claim Interpretation

In an *inter partes* review, claim terms in an unexpired patent are given their "broadest reasonable construction in light of the specification of the patent in which they appear." 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S.Ct. 2131, 2144–46 (2016). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the

context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. "m-regular"

Petitioner proposes the term "m-regular," recited in at least independent claim 1, means "each node is connected to exactly *m* other nodes." Pet. 14 (citing Ex. 1101, 4:38–39, 14:65-15:7). Patent Owner does not offer a construction of this term. Prelim. Resp. 13; PO Resp. 17–23. For purposes of institution, we agreed that Petitioner's proposed construction accords with the broadest reasonable construction consistent with the specification, which, for example, describes a graph in which each node is connected to four other nodes as a 4-regular graph. Ex. 1101, 4:38–39. We see no need to alter that construction here. Accordingly, we construe "m-regular" to mean "each node is connected to exactly *m* other nodes."

2. "m-connected"

Petitioner proposes the term "m-connected," recited in at least dependent claims 4 and 5, means "dividing the network into two or more separate parts would require the removal of at least *m* nodes." Pet. 14 (citing Ex. 1101, 4:42–46). Patent Owner does not offer a construction of this term. Prelim. Resp. 13; PO Resp. 17–23. The portion of the specification cited by Petitioner describes the 4-connected graph as having the property that it would take the failure of at least 4 nodes to divide the graph into disjoint subgraphs. Ex. 1101, 4:42–46. Because Petitioner's construction accords with the specification description, we see no reason to alter that construction here. Accordingly, we construe "m-connected" to mean "dividing the network into two or more separate parts would require the removal of at least *m* nodes."

3. "game environment"

Patent Owner contends that the term "game environment," recited in independent claims 1, 16, and 18, should be construed as a "logical broadcast channel on which a game is played, which overlays an underlying network." PO Resp. 18. Patent Owner also contends the term is not followed by a transition phrase such as "comprising" or "consisting of," and is, therefore, not part of a preamble. *Id.* at 29–30. Patent Owner further contends that, even if "[a] computer network for providing a game environment for a plurality of participants" is considered a preamble, it provides antecedent basis for the terms "the network" and "participants," and, therefore, should be treated as a limitation. *Id.* at 30–31. We do not agree with Patent Owner.

"It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable." *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997); *see also In re Zierden*, 411 F.2d 1325, 1328 (CCPA 1969) ("[A] mere statement of a new use for an otherwise old or obvious composition cannot render a claim to the composition patentable."). The facts of *Schreiber* are particularly relevant to the issue here. There, the apparatus claim at issue recited: "A dispensing top *for passing only several kernels of a popped popcorn at a time from an open-ended container* filled with popped popcorn, having a generally conical shape . . . ." *Schreiber*, 128 F.3d at 1475 (emphasis added). The Federal Circuit held that, although the "[prior art did] not address the use of the disclosed structure to dispense popcorn," the absence of such disclosure did not defeat anticipation. *Id.* at 1477. In other words, the court

determined that the recitation of the popcorn dispensing use did not have patentable weight. *Id.*

It is worth noting that in *Schreiber*, similar to here, the claim lacked the transitional phrase "comprising" or "consisting of" to indicate whether the statement was part of a preamble. Indeed, there was no discussion of whether the statement of intended use in *Schreiber* (i.e., "for passing only several kernels of popped popcorn") was a preamble statement or not. Whether the statement of intended use appears in the body of the claim or the preamble is immaterial. *See In re Anderson*, Nos. 2016-1156 and 2016-1157, 2016 WL 5940057, *4 (Fed. Cir. Oct. 13, 2016) (holding "for use" statements in the body of the claim do not add structural limitations).

We consider whether the circumstances here compel a different result than in *Schreiber*. Patent Owner is correct that the terms "network" and "participant," used in the body of the claims, find their antecedent basis in the opening term that includes the disputed game environment (i.e., "[a] *computer network* for providing a game environment for a plurality of *participants*"). However, although this suggests "computer network" and "plurality of participants" are essential structure within the claim, the suggestion does not extend to "game environment," which, we determine, is not essential to understanding the structurally complete invention otherwise recited in the claims. *See Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d 801, 810 (Fed. Cir. 2002) (holding the phrase "located at predesignated sites such as consumer stores" not essential to understand limitations or terms in the claim).

In making this determination, we have also considered the specification. *See id.* at 808 (noting that the specification may underscore

certain structure or steps as important). The abstract of the '344 patent describes the invention as a "broadcast technique" used in a communications network without any reference to a "game environment." Ex. 1101, at [57]. When the specification does refer to a "game environment," it explains that "a game environment is *implemented using broadcast channels*" in one embodiment of the disclosed invention. *Id.* at 16:30–31 (emphasis added). It further provides:

> Each player joins a game (e.g., a first person shooter game) *by connecting to the broadcast channel on which the game is played*. Each time a player takes an action in the game a message representing that action is broadcast on the game's broadcast channel. In addition, a player may send messages (e.g., strategy information) to one or more other players by broadcasting a message.

Id. at 16:34–40 (emphasis added). Thus, the '344 patent describes a "game environment" as a *use* of a broadcast channel on a communications network.

The specification consistently describes a broadcast channel in terms of the structural elements recited in claim 1. For example, similar to claim 1, Figure 1 is described as "a graph that is 4-regular and 4-connected *which represents a broadcast channel*." Ex. 1101, 2:45–46 (emphasis added); *see id.* at 2:47–61 (referring to the interconnected computers in the networks of Figures 2–5B as broadcast channels); *id.* at 4:23–26 (describing the broadcast channel as "a graph of point-to-point connections (i.e., edges) between host computers (i.e., nodes)"). In view of these descriptions, we conclude that claim 1 recites a structurally complete invention (i.e., "a broadcast channel"), which may be used to provide a "game environment."

Patent Owner submits that a person of ordinary skill in the art reading a description of a "game environment" in the '344 patent would understand

that a game environment operates at the "application layer." PO Resp. 19. This contention, however, merely reinforces our view that "game environment" does not add essential structure to claim 1, but instead is a term describing an application, i.e., a use, of the structure set forth in claim 1.

In view of the foregoing, we decline to adopt Patent Owner's proposed construction of "game environment" and, instead, determine that the term is a statement of intended use not entitled to patentable weight. *See Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997) (holding that a preamble is not limiting "where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention").

4. "participant"

Patent Owner contends that the term "participant" should be construed as "a game application program that interacts with a logical broadcast channel which overlays an underlying network." *Id.* at 21. Patent Owner contends that the specification's statement that a game environment "is provided by a game application program executing on each player's computer that interacts with a broadcaster component," as well as descriptions of players connecting to a broadcast channel and the broadcast channel overlaying a point-to-point network, support its construction. *Id.* (citing, e.g., Ex. 1101, 16:34–36, 4:14–26, 1:44–57). Accordingly, Patent Owner contends, the term "'participant' differentiates between the physical computers of an underlying network and the gaming applications that actually participate in a particular broadcast channel." *Id.* at 22 (citing, e.g., Ex. 1101, 1:44–57, 16:30–46).

Petitioner contends the specification uses "participant" without imposing any such limitations. Pet. Reply 2 (citing Ex. 1101, 1:44–49, 1:40–43, 1:54–67, 2:14–20, 2:31–38). Accordingly, Petitioner contends, under the broadest reasonable interpretation, the term "participant" should receive its plain meaning ("participant in the network"). *Id.* at 3.

As an initial matter, we observe that Patent Owner's proposed construction, "a game application program that interacts with a logical broadcast channel which overlays an underlying network," builds on its proposed construction of "game environment" by requiring a participant to be a "game *application program*" that interacts with a logical broadcast channel. However, as set forth above, "game environment" is an intended use of the computer network recited in the claims. Thus, adding an application program requirement to "participant" is an attempt to add a further limitation (i.e., "application program") to the intended use that, we determine, is not a claim limitation.

On the other hand, claim 9, which depends from claim 1, recites that "each *participant* is a *process executing on a computer*." Ex. 1101, 29:54–55. The '344 patent uses the term "process" in describing both application programs and parts of programs. *See, e.g.*, *id.* at 15:29–36 ("Computer 600 includes multiple application programs 601 executing as separate processes. . . . Alternatively, the broadcaster component may execute as a separate process or thread from the application program."), Fig. 9 ("Contact process"). Thus, as used in claim 9, participant encompasses more than *application programs*—the limitation Patent Owner seeks to impose on "participant" in claim 1. By imposing a narrower limitation on "participant," for purposes of claim 1, than the limitation imposed by

claim 9, Patent Owner's proposed claim construction is inconsistent with the specification.[6]

Petitioner proposes that "participant" be construed to have its "plain meaning." Pet. Reply 3 ("participant in the network"). For reasons discussed below, we agree that the plain meaning of the term "participant," including the various constraints placed on it by the claims themselves, would be sufficiently clear to a person of ordinary skill in the art for purposes of the analysis.

5. "connection"

Patent Owner contends the term "connection" should be construed as "an edge between two game application programs connected to a logical broadcast channel that overlays an underlying network." PO Resp. 22–23 (citing Ex. 1101, 4:51–53, 11:22–23, claims 1 and 19).

As discussed above, we disagree with Patent Owner's attempt to introduce a "game application program" limitation into claim 1. When

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[6] Patent Owner contends that its constructions are "unrebutted" and that Petitioner's declarant, Dr. Karger, testified that he had no understanding of the terms Patent Owner seeks to construe. PO Resp. 22–23 (citing, e.g., Ex. 2033, 100:23–101:8, 51:14–52:9). We disagree. Petitioner "interpreted [terms] for purposes of this review with their plain and ordinary meaning consistent with the specification of the '344 patent." Pet. 13; Pet. Reply 3. Moreover, we have reviewed portions of Dr. Karger's testimony cited by Patent Owner (*see* PO Resp. 26–28; Mot. Obsv. 2, 5, 7-9), and do not agree that he had no understanding of the terms. Although Dr. Karger did not attempt to provide an explicit definition of terms Patent Owner seeks to construe (*see, e.g.*, Ex. 2034, 120:10–11 ("I was not asked to scope the exact boundaries of the meaning")), Dr. Karger did apply his understanding of the meaning of these terms to the art. For these reasons, we reject Patent Owner's suggestion that his testimony be given no weight.

applied to "connection," such a limitation is incorrect for an additional reason. As Petitioner points out, claim 8 recites that "connections are TCP/IP connections," which means that connections may exist at the transport layer rather than at the application layer as Patent Owner's construction requires.[7] Pet. Reply 2 (citing Ex. 2022 ¶ 31). Similarly, in the specification, connections are described without reference to application programs. *See* Ex. 1101, 1:43–45 ("The point-to-point network protocols, such as UNIX pipes, TCP/IP, and UDP, allow processes on different computers to communicate via point-to-point connections."); 6:22–25 (discussing computer connections using the TCP/IP protocol).

Petitioner proposes that "connection" be construed to have its "plain meaning." Pet. Reply 3 ("connection between participants"). For reasons discussed below, we agree that the plain meaning of the term "connection," including the various constraints placed on it by the claims themselves—e.g., participants have connections through which data can be sent or received—would be sufficiently clear to a person of ordinary skill in the art for purposes of the analysis.

D. Petitioner's Asserted Ground of Unpatentability

Petitioner contends that claims 1–11 and 16–19 are unpatentable under 35 U.S.C. § 103(a) as obvious over Shoubridge. Pet. 16–59. We have reviewed the parties' arguments in the Petition, Patent Owner Response, and Reply, as well as the relevant evidence discussed in those papers and other

[7] We point out that the specification does not use the term "layer" or refer to the OSI Reference Model.

record papers, including the declarations of Dr. Karger[8] and Dr. Goodrich. For the reasons that follow, we determine Petitioner has shown by a preponderance of the evidence that claims 1–11 and 16–19 are unpatentable as obvious over Shoubridge.

1. Summary of Shoubridge

Shoubridge describes techniques for routing messages to all the participants in a communications network. Ex. 1105, 1.[9] Specifically, Shoubridge models a communication network as a graph in which "[e]ach node functions as a source of user traffic entering the network where traffic can be destined to all other nodes within the network." *Id.* at 2. In a specific example, Shoubridge describes a "64 node network with connectivity of degree 4" modeled as a "large regular graph forming a manhattan grid network that has been wrapped around itself as a torus." *Id.* at 3. Shoubridge describes a routing protocol called "constrained flooding, the most efficient way to flood an entire network." *Id.* at 2. In constrained

[8] We disagree with Patent Owner that Dr. Karger's opening obviousness analysis (Ex. 1119) is deficient for failure to consider secondary considerations, as Patent Owner alleges. *See* PO Resp. 28. Patent Owner directs us to no authority for the proposition that Dr. Karger's opening declaration, submitted at the time of the Petition, was required to anticipate and address secondary considerations that had not yet been articulated by Patent Owner and submitted for the record. We have considered *Intri-Plex Technologies, Inc. v. Saint-Gobain Performance Plastics Rencol, Ltd.*, IPR2014-00309 (Paper 83) (PTAB Mar. 23, 2014), cited by Patent Owner, but that case simply states that secondary considerations, *if in evidence*, must be considered. *See* slip op. at 35. Here, once Patent Owner presented its evidence and arguments, in the Response, Dr. Karger submitted a rebuttal declaration addressing Patent Owner's evidence. *See* Ex. 1125 ¶¶ 178–214.

[9] We refer to exhibit pagination.

flooding, a packet received at a node is rebroadcast on all links except the link it was received on, and packets are numbered such that if a "packet[] revisit[s] a node with the same sequence number, [it is] discarded." *Id.* at 3. Shoubridge describes simulations using both constrained flooding and minimum hop algorithms that use routing tables. *Id.* at 2–4. Ultimately, a hybrid routing model is proposed in which constrained flooding is used if routing tables are unable to provide a next node entry for forwarding user traffic, but minimum hop is used if a valid next node entry exists. *Id.* at 4–5.

2. Status of Shoubridge as a Prior Art Printed Publication

As a preliminary matter, we address whether Shoubridge is a prior art printed publication under 35 U.S.C. § 102(b). *See* 35 U.S.C. § 311(b). It is Petitioner's burden to prove that it is. *See* 35 U.S.C. § 316(e). The determination of whether a document is a "printed publication" under 35 U.S.C. § 102 "involves a case-by-case inquiry into the facts and circumstances surrounding the reference's disclosure to members of the public." *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). "Because there are many ways in which a reference may be disseminated to the interested public, 'public accessibility' has been called the touchstone in determining whether a reference constitutes a 'printed publication' bar under 35 U.S.C. § 102(b)." *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1348 (Fed. Cir. 2016) (citation omitted).

For purposes of institution, we accepted Petitioner's unchallenged contention that Shoubridge was a paper published and presented at an IEEE conference in 1997. Dec. 6; Pet. 3, 19 (citing Ex. 1105; Ex. 1120). In its Response, Patent Owner now challenges this contention. PO Resp. 23–25. Specifically, Patent Owner argues that Dr. Shoubridge admitted in his

deposition that the paper he identified in his declaration (Ex. 1120 at Exhibit B) as the paper presented at the 1997 International Conference on Communications in Montreal, on June 8–12, 1997, "was not the same paper that was presented at the conference." *Id.* at 24 (citing Ex. 2031, 77:12–78:1, 83:4–11). Patent Owner also argues that the paper cannot be shown to have been disseminated or otherwise made available based on the publication date on the face of the paper. *Id.* (citing *Kyocera Wireless Corp. v. Int'l Trade Comm'n*, 545 F.3d 1340, 1350 (Fed. Cir. 2008)).

Petitioner disputes Patent Owner's contention that Dr. Shoubridge could not identify his paper. Pet. Reply 4–5. Petitioner directs us to Dr. Shoubridge's testimony that his paper (i.e., Shoubridge) was handed out to 500–1000 attendees as part of the proceedings and that the Exhibit "correlate[s] 100 percent with what was presented at the conference in 1997" (Ex. 2031, 78:12–79:1). Pet. Reply 4.[10] Petitioner also contends Dr. Shoubridge's second declaration explains that the $10 price tag and copyright notice (the alleged source of the discrepancy according to Patent Owner (Tr. 54:15–55:8)) was indeed on the copy distributed at the June 1997 conference. Pet. Reply 4–5 (citing Ex. 1136 ¶¶ 4–8; Ex. 1137).

We find that Petitioner has satisfied its burden of proving that Shoubridge was a printed publication that was publicly available as of June

[10] We have considered Patent Owner's contention that this portion of Petitioner's Reply exceeds the proper scope of reply (*see* Paper 68), but we disagree. We determine that this portion of the Reply, as well as the others cited herein, is properly responsive to evidence and arguments raised by Patent Owner in its Response and Preliminary Response (*see also* Paper 70), and, therefore, does not raise a new issue or belatedly present evidence. *See* Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012).

1997. At the outset, we observe that Dr. Shoubridge is a third-party witness with no alleged interest in the outcome of these proceedings. *See* Ex. 2031, 7:9–16, 90:25–91:7. In his first declaration, he testified that the attached Exhibit B[11] was the paper he presented at the 1997 conference. Ex. 1120 ¶¶ 6–7. Although Patent Owner is correct that the pages of Exhibit B were not the *actual* pages from the conference proceeding (as in physically obtained at the conference), but a reproduction, Patent Owner does not address Dr. Shoubridge's repeated testimony that the content of the paper was identical in every respect to what was presented and distributed in bound conference volumes. Ex. 2031, 77:24–78:7 ("So I can confirm that that [Exhibit B] paper was the paper I presented at the conference and it was put in the proceeding. That was what was published in the -- that content of that paper is what was published in the proceedings."), 81:19–82:4 ("[P]ages 1381 to 1386 will correlate 100 percent with what was submitted as Exhibit [B]. So it's an accurate reproduction, but it is not an actual bound – you know, it's not pages out of the bound volume."). Patent Owner does not direct us to any authority that requires the same physical paper to be in evidence for a reference to qualify as prior art.

We have considered the fact that Dr. Shoubridge was, at first, unable to confirm that the $10 price indicated on the first page of the paper (*see* Ex. 1105, 1) was on the version of the paper presented in the conference and contained in the bound conference proceedings. Ex. 2031, 80:15–19 ("Maybe they do, but this one doesn't."). However, Dr. Shoubridge addressed this perceived discrepancy in his second declaration, where he

[11] Exhibit B is identical to the Shoubridge reference, Exhibit 1105.

stated that he was not looking at the first page of his article when asked about the price indication. *See* Ex. 1136 ¶¶ 4–8; Pet. Reply 4–5. We find this explanation credible. With its Reply, Petitioner submitted Ex. 1137, which appears to be a scan of the bound version of Dr. Shoubridge's article. Pages 31 to 36 of Exhibit 1137 appear to be identical to the Shoubridge reference in every respect including formatting, pagination, *and the $10.00 indication on the first page*.[12] Consequently, Ex. 1137 confirms Dr. Shoubridge's deposition testimony as well as his second declaration that the contents and $10 price of the paper on Exhibit B were identical to those of the paper presented at the conference.

In sum, Dr. Shoubridge's testimony, which we find to be credible, supports Petitioner's contention that the Shoubridge reference (Ex. 1105) was a paper that was published and disseminated at the 1997 IEEE conference.[13] Because the 1997 date on the face of Shoubridge is supported by evidence, it is unnecessary to consider Patent Owner's argument that standing alone, the 1997 date on the face of the paper, is insufficient

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[12] The issue of whether the bound conference proceeding contained the $10 indication, therefore, is resolved by Exhibit 1137, which contains the $10 indication on its first page. As Petitioner represents, and Dr. Shoubridge states in his second declaration, Dr. Shoubridge may not have been looking at the first page of the paper when being cross-examined about the price indication. Pet. Reply 4–5; Ex. 1136 ¶¶ 4–8.

[13] Patent Owner does not argue that presentation and dissemination at the conference are insufficient to prove public availability. In any event, the circumstances of this IEEE conference, in which 500–1000 people attended and were given copies of the proceedings (Ex. 2031, 85:6–11, 86:1–10), are more than sufficient for Shoubridge to qualify as a printed publication. *See Massachusetts Inst. of Tech. v. AB Fortia*, 774 F.2d 1104, 1109 (Fed. Cir. 1985).

evidence of publication date and public availability. We determine Shoubridge to be a printed publication for purposes of 35 U.S.C. §§ 102(b) and 311(b).

3. Claims 1, 16, and 18

Claims 1, 16, and 18 recite "[a] computer network for providing a game environment for a plurality of participants." Petitioner relies on Shoubridge's disclosure of "forwarding user traffic between source and destination nodes in a communications network" as disclosing the recited network and plurality of participants. Pet. 29 (citing Ex. 1105, 1; Ex. 1119 ¶ 103). Petitioner also relies on Shoubridge's description of flooding algorithms broadcasting user traffic. *Id.* (citing Ex. 1105, 1; Ex. 1119 ¶ 105). To the extent the "game environment" recited in the preamble is considered a limitation, Petitioner contends it would have been obvious to a person of ordinary skill in the art that computer gaming was among the various uses for the network disclosed in Shoubridge. *Id.* at 57 (citing Ex. 1119 ¶¶ 223–25).[14]

Patent Owner contends Shoubridge does not teach the claimed network because it is silent with regard to gaming. PO Resp. 32. Patent Owner presents various arguments for why Shoubridge's network would not be used for computer gaming and contends Dr. Karger's testimony that Shoubridge's network would be used for gaming is conclusory. PO Resp. 34–38. Patent Owner also argues that Shoubridge's disclosure of forwarding user traffic over a network does not satisfy its constructions of a

[14] Other than the recited "game environment," Petitioner contends that Shoubridge explicitly discloses the limitations of claims 1, 16, and 18. Pet. 28–34, 54–57.

"game environment" as a "logical broadcast channel on which a game is played, which overlays an underlying network," and "participant" as a "game application program that interacts with a logical broadcast channel which overlays an underlying network." *Id.* at 33. Specifically, Patent Owner contends Shoubridge is concerned only with communications at the network layer of the OSI model, not the transfer of data at the application layer between game application programs that connect to a logical broadcast channel, as its proposed constructions require. *Id.* at 36 (citing Ex. 2022 ¶¶ 72–76).

Initially, because we have determined that "providing a game environment" in the preamble of the independent claims is an intended use that is not limiting, *supra* II.C.3, we are not persuaded by Patent Owner's arguments regarding a "game environment." We also disagree with Patent Owner's contention that Shoubridge's disclosure of forwarding user traffic over a network does not teach a network with "participants" as properly construed because we have not adopted Patent Owner's construction of that claim term as an application program that operates at the application layer.

We now consider whether the evidence cited by Petitioner supports its contention that Shoubridge teaches the recited limitations. As discussed, "game environment" is not limiting, and therefore we need not address Petitioner's contention that a person of ordinary skill in the art would have used Shoubridge's network for computer gaming. With respect to the recited computer network and plurality of participants, we agree with Petitioner that Shoubridge discloses them. As Patent Owner concedes, Shoubridge's disclosure of flooding alone describes sending data at least at the network layer, which indisputably discloses the existence of a "computer

network." *See* PO Resp. 37 (referring to Shoubridge's "network-level flood routing algorithms"). Moreover, aside from arguments depending on its proposed claim construction, Patent Owner does not address Shoubridge's disclosure of forwarding user traffic between source and destination nodes. We agree that the term "participant" encompasses source and destination "nodes" receiving user traffic. Indeed, the '344 patent contemplates computers and processes or programs executing on a computer as participants. *See* Ex. 1101, 13:24–25 ("[N]eighbors of a newly connecting computer are preferably selected randomly . . . ."); 29:54–55 ("[E]ach participant is a process executing on a computer."); Ex. 1119 ¶ 40.

Claims 1 and 18 also recite "each participant having connections to at least three neighbor participants." Claim 16 recites "each participant having connections to exactly four neighbor participants." Petitioner directs us to Shoubridge's "64 node [manhattan] grid network with connectivity of degree 4" as disclosing connections to at least three neighbor participants and exactly four neighbor participants. Pet. 30 (citing Ex. 1105, 3); Ex. 1119 ¶ 108.

Patent Owner disputes this contention based on its proposed construction of participants (i.e., "a participant would be located on the application layer" (PO Resp. 38–39), "simulated nodes in Shoubridge are simulations of physical computers at the network layer, rather than . . . at the application layer" (*id.* at 39)), which we reject for the reasons discussed above. Patent Owner also contends that even if its constructions are not adopted, "Shoubridge does not teach the concept of . . . participants in an environment." *Id.* But this argument also relies on Petitioner's construction

in which the claims are limited to a game environment, contrary to our determination that "game environment" is an intended use.

Dr. Karger, Petitioner's declarant, testifies that a manhattan grid network with connectivity of degree 4 means each node is connected to exactly 4 other nodes. Ex. 1119 ¶¶ 89–90. We find this unrebutted testimony to be credible. Accordingly, we determine that Petitioner has sufficiently supported its contention that Shoubridge discloses "connections to at least three neighbor participants" (claims 1 and 18) and "connections to exactly four neighbor participants" (claim 16).

Claims 1, 16, and 18 further recite:

> wherein an originating participant sends data to the other participants by sending the data through each of its connections to its neighbor participants and wherein each participant sends data that it receives from a neighbor participant to its other neighbor participants.

For this "data sending" limitation, Petitioner cites Shoubridge's description of constrained flooding in which a packet is broadcast to all other participants (i.e. nodes) on outgoing links (i.e., all links except for the one it received the packet on) as disclosing the recited limitation. Pet. 32 (citing Ex. 1105, 2–3); Ex. 1119 ¶ 110.

Patent Owner contends that the simulated packets sent and received in Shoubridge are at the network layer and not "between participants that are participating in a gaming environment." PO Resp. 41. Rather, citing its declarant, Dr. Goodrich, Patent Owner contends that the simulated packets are sent only to find routes in the simulation for following packets to follow. *Id.* at 41–42 ("Moreover, the flood search algorithm in Shoubridge only sends control packet data to find routes in the simulation. Control packets

find[] a path or route for all following packets to follow. . . . The user packets follow the path found by the control packet and the updated routing tables." (citing Ex. 2022 ¶ 34)). We disagree.

Shoubridge's simulation is based on both "constrained flooding" in which "all nodes are visited at least once" (and which Petitioner relies on) and minimum hop "routing algorithms" in which "control messages are exchanged between neighboring nodes for the purpose of maintaining routing tables." Ex. 1105, 2–3; *see id.* at Fig. 1 ("Flood" and "Minhop"). Dr. Goodrich's testimony that control packets are sent to find routes does not explain which algorithm in Shoubridge it is based on, but it appears to be based on the description of the routing algorithm, not the constrained flooding on which Petitioner relies. As such, Dr. Goodrich's testimony does not address Petitioner's evidence that the limitation is disclosed by constrained flooding.

Shoubridge describes constrained flooding as follows:

> Any user packet transmitted from a node is copied and broadcast on all outgoing links. Intermediate transit nodes do not broadcast a packet on the same link that a packet was originally received on. Constrained flooding uniquely identifies packets associated with a particular flood search by using sequence numbering. Nodes store sequence numbers of packets already flooded. If any packets revisit a node with the same sequence number, they are discarded instead of being further broadcast to neighbours. This technique ensures that all nodes are visited at least once and duplicated traffic is kept to a minimum throughout the network.

Ex. 1105, 2–3. We find this description of "user packets" being copied and broadcast on all outgoing links to intermediate nodes and resent until all nodes are visited at least once to support Dr. Karger's testimony that Shoubridge discloses "send[ing] data" in the manner required by the claim

limitation. *See* Ex. 1119 ¶ 110. Accordingly, we find Shoubridge satisfies the data sending limitation.

Finally, claim 1 recites that the "network is m-regular, where m is the exact number of neighbor participants" and "wherein the number of participants is at least two greater than m, thus resulting in a non-complete graph." Claim 18 recites that the "network is m-regular and the network forms an incomplete graph." Here again, Petitioner relies on Shoubridge's 64 node Manhattan grid network with connectivity of degree 4 as disclosing these limitations. Pet. 32–33 (Ex. 1105, 3). Petitioner relies on this description as teaching a similar requirement for claim 16 ("stable 4-regular state" and "at least six participants to result in a non-complete graph"). *Id.* at 55. Petitioner also relies on Dr. Karger's testimony that a person of ordinary skill would have understood this description to disclose a non-complete graph that is m-regular (i.e., each participant has exactly 4 neighbor participants) and in which the number of participants is at least two greater than m (i.e., 64 is at least two greater than 4). Ex. 1119 ¶¶ 89–91, 116, 120, 204. Patent Owner does not present an argument in response to these contentions.

We agree the cited network in Shoubridge satisfies the construction of "m-regular" because each node is connected to exactly m = 4 neighboring nodes and that the graph is non-complete, based on Dr. Karger's unrebutted testimony. We also agree that the number of participants (i.e., 64) is at least two greater than m (i.e., $64 > 2 * (m = 4)$), as required by claim 1, and at least 6, as required by claim 16.

For the foregoing reasons, Petitioner sufficiently establishes that Shoubridge teaches all the limitations recited in claims 1, 16, and 18.

4. Claims 2–5 and 11

Claim 2 requires that each participant of the computer network of claim 1 is "connected to 4 other participants." Claim 3 requires that "each participant is connected to an even number of participants." Petitioner contends these limitations are satisfied by Shoubridge's 64 node grid network *with connectivity of degree 4*, which satisfies both claim 2's requirement for connections to four other participants and claim 3's requirement for connections to an even number of participants. Pet. 34 (citing Ex. 1105, 3; Ex. 1119 ¶¶ 123–126). Patent Owner does not address these limitations.

Claim 4 requires the network of claim 1 to be "m-connected, where m is the number of neighbor participants of each participant." Claim 5 requires the network to be both m-connected and m-regular. Petitioner relies again on Shoubridge's 64 node grid network with connectivity of degree 4 as satisfying the respective limitations. Pet. 35–36 (citing Ex. 1105, 3; Ex. 1119 ¶¶ 127–131). We construed m-connected to mean "dividing the network into two or more separate parts would require the removal of at least *m* nodes." Petitioner contends Shoubridge's network is 4-connected and that it would take the failure of at least 4 nodes to divide the network into two or more separate parts. *Id.* at 35; Ex. 1119 ¶ 90. Petitioner contends Shoubridge's network is 4-regular for the same reasons as discussed above with respect to claim 1 (i.e., each node is connected to exactly 4 other nodes), which also requires the network to be m-regular. Pet. 35. Patent Owner does not address these limitations.

Claim 11 recites that "each participant sends to each of its neighbors only one copy of the data." For this limitation, Petitioner relies on

Shoubridge's statement that "[c]onstrained flooding uniquely identifies packets . . . . If any packets revisit a node with the same sequence number, they are discarded instead of being further broadcast to neighbours." Pet. 41 (quoting Ex. 1105, 2); Ex. 1119 ¶ 153. Patent Owner does not address this limitation.

We have reviewed the foregoing contentions regarding claims 2–5 and 11 and determine that they are supported by the record. Therefore, Petitioner sufficiently establishes that Shoubridge teaches all the limitations recited in claims 2–5 and 11.

5. Claims 6 and 7

Claims 6 and 7 respectively require all the participants be peers and the connections be peer-to-peer connections. Petitioner contends that these limitations are taught by Shoubridge's network topology and statement that the "total load entering (and leaving) the network . . . is evenly distributed across all *N* nodes." Pet. 37 (quoting Ex. 1105, 3); *see also* Ex. 1119 ¶ 134. Because user traffic is evenly distributed, according to Petitioner, nodes are treated equally. Ex. 1119 ¶¶ 134, 227 ("A POSITA would therefore have understood that the disclosed processors constitute peers connected in a peer-to-peer network by peer-to-peer connections."); Pet. Reply 16 n.13 (citing Ex. 1119 ¶¶ 226–29).

Patent Owner contends that "[a] POSITA would understand that peer-to-peer communications occur at the application-level, using a structured or unstructured overlay network" and that the '344 patent only discusses peer-to-peer networks in an application-level context. PO Resp. 43 (citing Ex. 1101, 13:26–34; Ex. 2022 ¶ 38; Ex. 2038).

To begin with, as with the limitations of claim 1, we reject the attempt to read an "application-layer" requirement into the claims. Here, both Patent Owner and Dr. Goodrich cite page 1 of Exhibit 2038 ("Schollmeier") as supporting this application-layer interpretation of peer-to-peer, but provide no further explanation.[15] Although Schollmeier does give "Napster" as an application-level example of a peer-to-peer network, it then states such networks can be described in "more than just an application specific way . . . simply as the opposite of Client/Server architectures." Ex. 2038, 1. Indeed, the paper states that "*[a] distributed network architecture may be called a Peer-to-Peer . . . network, if the participants share a part of their own hardware resources . . . to provide the Service and content offered by the network.*" *Id.* ("Definition 1").

These descriptions do not indicate that peer-to-peer is limited to "communications [that] occur at the application-level, using a structured or unstructured overlay network," as Patent Owner asserts (PO Resp. 43), but broadly refer to "networks" in which participants share resources without a central server. Similarly, the cited portion of the '344 patent also does not support Patent Owner's proposed construction of peer-to-peer, but simply states all connected computers are peers as far as broadcasting is concerned. *See* Ex. 1101, 13:24–31. We, therefore, are not persuaded by Patent

[15] Patent Owner does not propose a construction for peer or peer-to-peer, or otherwise purport to analyze these terms under the broadest reasonable interpretation standard. *See* 37 C.F.R. § 42.104(b)(3).

Owner's arguments relating to an application-layer requirement of the term peer-to-peer.[16]

Patent Owner also contends "Shoubridge discloses a route searching algorithm, which is unrelated to peer-to-peer communications," and that its "simulation is designed to evenly distribute[] packets to each of the 64 nodes so that each node can act as a source node." PO Resp. 44. Patent Owner further contends that "[w]hen asked how the even distribution simulation relates to peer-to-peer technology, Dr. Karger could not provide an answer." *Id.* (citing Ex. 2034, 137:6–138:6).

We are not persuaded by Patent Owner's argument. Shoubridge clearly teaches a simulation based on both routing algorithms and "constrained flooding," the latter of which Petitioner relies on. Ex. 1105, 2–3, Fig. 1 ("Flood" and "Minhop"); *see* Pet. 31–32 (citing Ex. 1105, 2–3); Ex. 1119 ¶ 110. Therefore, Patent Owner's reliance on Shoubridge's discussion of route searching algorithms does not address Petitioner's evidence based on constrained flooding. Moreover, we have reviewed the cited portion of Dr. Karger's testimony and find it does not support Patent Owner's contention that he admitted his reliance on distribution simulation does not relate to peer-to-peer connections. *See* Ex. 2034, 137:6–138:6.

We find the evidence supports Dr. Karger's declaration regarding peers and peer-to-peer connections in Shoubridge. Among other things, "[e]ach node functions as a source of user traffic entering the network, where traffic can be destined to all other nodes within the network," and

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[16] We also reject Patent Owner's contention that, unlike Shoubridge, peer-to-peer networks are "continuously evolving systems, with peers leaving and joining," as unsupported by the record. *See* PO Resp. 45.

"[t]he total load entering (and leaving) the network . . . is distributed evenly across all *N* nodes." Ex. 1105, 2–3. In addition, in the constrained flooding algorithm, each node behaves the same, whereby each "user packet transmitted from a node is copied and broadcast on all outgoing links." *Id.* at 3. We find this evidence supports Dr. Karger's opinion that all nodes are peers (claim 6) because "*each node has a substantially identical function*, and there is no hierarchy or privileged participant in the disclosed graph of 64 nodes." Ex. 1119 ¶ 134 (emphasis added); *see* Ex. 1125 ¶ 144 ("no node has a special role to play"). Similarly, with respect to claim 7, the above-cited evidence, specifically the fact that each node communicates with its neighboring nodes, supports Dr. Karger's opinion that the disclosed network topology is peer-to-peer. *See* Ex. 1119 ¶¶ 134, 227. Because it is consistent with the evidence, we credit Dr. Karger's testimony.

Petitioner contends that even if the disclosures in Shoubridge cited above do not sufficiently teach that the nodes on Shoubridge's network are peers and the connections are peer-to-peer, it would have been obvious to a person of ordinary skill in the art that the nodes and connections in Shoubridge could be implemented in that manner. Pet. 57–58 (citing Ex. 1119 ¶¶ 226–29). Petitioner cites testimony of Dr. Karger stating that an ordinarily skilled artisan would have been motivated to do so to achieve, "for example, improved reliability." Ex. 1119 ¶ 228. Patent Owner disputes Petitioner's obviousness analysis, contending that Dr. Karger never explains his rationale based on improved reliability and, thus, fails to explain why a person of ordinary skill in the art would have modified Shoubridge. PO Resp. 46. We need not address these arguments because, as explained

above, we find Shoubridge teaches that its participants are peers and that its connections are peer-to-peer.

For the foregoing reasons, Petitioner sufficiently establishes that Shoubridge teaches all the limitations recited in claims 6 and 7.

6. Claim 8

Claim 8 requires the connections of claim 1 to be "TCP/IP connections." Petitioner contends it would have been obvious to implement the communications network disclosed in Shoubridge with TCP/IP connections as required by claim 8, because TCP/IP is a well-known network protocol and, therefore, an obvious design choice. Pet. 58; Ex. 1119 ¶¶ 230–34.

Patent Owner contends "[a] POSITA would understand that the '344 Patent is generally geared towards an overlay network operating on top of a reliable underlying network, like the TCP/IP communication protocol." PO Resp. 47 (citing Ex. 2022 ¶ 108); *id.* at 48 ("[A]t least because Shoubridge fails to teach an overlay network, the incorporation of TCP/IP with Shoubridge would not work."). We disagree because this argument again relies on proposed claim constructions that we reject, namely, that the claims require the presence of an overlay network in Shoubridge. In addition, Patent Owner fails to explain why a limitation directed at the implementation of a transport-layer protocol (i.e., TCP/IP) (*see, e.g.*, Ex. 2022 ¶ 31) would require an "overlay network" to work.

Patent Owner also contends that the use of flooding, as disclosed in Shoubridge, "would cause problems in a large network utilizing TCP/IP." PO Resp. 48 (citing Exs. 2037, 2046). However, the claims are not directed to a "large network," but ones with as few as 6 participants (e.g., "at least

two greater than m" (claim 1) or "at least six participants" (claim 16)). Moreover, we have reviewed the cited evidence but we observe that the discussions of flooding do not appear to discourage the use of TCP/IP for connections. The issue is not whether flooding itself is impractical, but whether it would have been obvious to implement flooding, as disclosed in Shoubridge (as well as in Exhibits 2037 and 2046), using TCP/IP for the connections.

Patent Owner contends Shoubridge is a simulation and intended for military applications, which do not use TCP/IP. PO Resp. 48 (citing Ex. 1105, 1, 3; Ex. 1106 ("Shoubridge Thesis"), 67). Thus, according to Patent Owner, a person of ordinary skill would have understood the flooding algorithms in Shoubridge to apply to a narrow set of uses, particularly the military, and not have sought to modify Shoubridge to use TCP/IP. PO Resp. 49.

We do not find these arguments persuasive. Shoubridge does not specifically mention military applications and, although acknowledging high network utilization, it teaches the use of flooding generally for robustness in dynamic networks outside of the simulation context. *See* Ex. 1105, 2, 3 ("It is reasonable to conclude that a large network similar to the one modelled, would require a flooding procedure if the network is to operate in a very dynamic, or potentially very dynamic environment."). Moreover, we agree with Petitioner and Dr. Karger that a person of ordinary skill in the art would have understood the tradeoffs between reliability and network resource usage when deciding whether to use constrained flooding in connection with the TCP/IP protocol (*see* Pet. Reply 18; Ex. 1125 ¶¶ 153–164), because Shoubridge explains these tradeoffs (*see* Ex. 1105, 2–3).

We have considered Patent Owner's argument that TCP/IP is a routing protocol and therefore not "compatib[le]" with Shoubridge's own "hybrid routing algorithm" (PO Resp. 49 (citing Ex. 2022 ¶ 110)), but we do not find this position credible. As we have noted throughout this Decision and the Decision to Institute, Petitioner relies on Shoubridge's constrained flooding technique, not its hybrid routing algorithm. *See* Pet. 32; Dec. 15. Patent Owner and Dr. Goodrich offer no credible technical reason why TCP/IP would not work with constrained flooding.[17] The fact that the '344 patent itself uses TCP/IP in such a network, without pointing out any of the alleged disadvantages Patent Owner relies on for its contentions, belies the argument that TCP/IP is not suitable for the disclosed techniques. *See* Ex. 1101, 6:25–27 ("[T]he broadcast technique establishes the computer connection using TCP/IP communications protocol, which is a point-to-point protocol . . . .").

Dr. Karger provides unrebutted testimony that TCP/IP is the dominant protocol of the most obvious example of a communications network (i.e., the "Internet itself"). *See* Ex. 1119 ¶ 232. We find this testimony credible because it is consistent with the '344 patent. Indeed, the specification describes TCP/IP as one of several background prior art point-to-point protocols allowing computers to communicate. Ex. 1101, 1:44–49. Thus,

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[17] For example, we do not find the argument that "flooding at the network layer can be considered a denial of service attack, which is illegal" (Ex. 2022 ¶ 110), to be credible. Because a person of ordinary skill in the art would have understood the costs and benefits of applying Shoubridge's constrained flooding technique to the nodes of an m-regular network, such a result as flooding the Internet would not be a realistic result (*see* Ex. 1125 ¶ 158). *See also KSR*, 550 U.S. at 421 ("A person of ordinary skill is also a person of ordinary creativity, *not an automaton*." (emphasis added)).

we agree that TCP/IP as the point-to-point protocol for constrained flooding, as disclosed in Shoubridge, would have been one of a "finite number of identified, predictable solutions." Pet. Reply 17 (citing *KSR*, 550 U.S. at 421). We also find Petitioner's additional rationale for combining TCP/IP with constrained flooding, based on reliability, to be supported by the record. *See* Pet. Reply 18; Ex. 1125 ¶ 155 ("[A] POSITA would have selected between TCP if seeking robust transport mechanism . . . or UDP if seeking a simpler protocol . . . with fewer guarantees."); ¶ 159 (describing use of TCP in ARPANET). Accordingly, we agree with and adopt Petitioner's rationale and motivation in support of its argument for obviousness of claim 8.

7. Claim 9

Claim 9 requires that "each participant is a process executing on a computer." Petitioner contends that, in view of Shoubridge's discussion of constrained flooding as the most efficient way to flood an entire network (Ex. 1105, 3), it would have been obvious that the processors disclosed in Shoubridge are computers and the disclosed flooding protocol would comprise a process on a computer. Pet. 58; Ex. 1119 ¶¶ 235–39; *see also* Ex. 1105, 1.

Patent Owner contends that "[a] POSITA reading the specification would understand that a participant is [a] game application program." PO Resp. 51. Patent Owner further contends "[t]his claim is not rendered obvious because Shoubridge only discloses an underlying network layer. Shoubridge never discusses the application layer where processes interact with each other to form an environment." *Id.* at 52.

We do not find these arguments persuasive because, to begin with, they depend on Patent Owner's proposed claim constructions that we reject. Moreover, Patent Owner does not address why Shoubridge's teachings (whether simulation or otherwise) would not be implemented as "a process on a computer," when the above cited evidence suggests a computer is what is contemplated. Ex. 1105, 1 (discussing computing processing power and memory within network nodes). We determine this evidence supports Dr. Karger's opinion that a person of ordinary skill would have found it routine to implement Shoubridge's nodes as a process on the disclosed computer (i.e., processor and memory). *See* Ex. 1119 ¶ 238. Accordingly, we agree with and adopt Petitioner's rationale and motivation in support of its argument for obviousness of claim 9.

8. Claims 10, 17, and 19

Claim 10 recites that "a computer hosts more than one participant." Claims 17 and 19 recite the same. Petitioner, relying on Dr. Karger, contends that the simulation of the 64 node (i.e., 64 participant) network in Shoubridge satisfies this limitation. *See* Pet. 58 (citing Ex. 1105, 2–3; Ex. 1119 ¶¶ 108, 116, 149–50). Dr. Karger states that a person of ordinary skill in the art would have understood this simulation to "typically run on a single computer, or at a minimum, simulated more than one participant using a single computer." Ex. 1119 ¶ 150.

Patent Owner contends that "[a] POSITA would understand that this claim element means that a computer hosts multiple participants by running different applications or multiple instances of the same applications that interact with each other." PO Resp. 52–53 (citing Ex. 1101, 15:10–17; Ex. 2022 ¶¶ 118–19; Ex. 2044, 176 (defining "host" as "a server that

performs centralized functions")). We do not find this argument persuasive. As an initial matter, we reject the attempt to add an "application" requirement to the claims for the reasons discussed above. Other than Patent Owner's argument, we find no evidence in the specification that the term "hosts more than one participant" means different applications or instances of the same application. The cited portion of the '344 patent does not mention a host at all and only mentions application programs as an *example* of a *process*. *See* Ex. 1101, 15:17–18 ("e.g., application programs"). Neither Patent Owner nor Dr. Goodrich (whose testimony substantially tracks Patent Owner's argument in this regard) explains how the dictionary definition of "host" (relating to a "server that performs centralized functions") is applicable in the context of the '344 patent.

Aside from its proposed construction of "hosts" and "participants," Patent Owner's contentions do not meaningfully address Dr. Karger's evidence, which is that a single computer would typically host the disclosed simulation of multiple participants.[18] For example, Patent Owner does not explain why such an assertion is "nonsensical," or why it is "irrelevant to the language of the claims." PO Resp. 54. Because this rebuttal is unsupported, it does not undermine Dr. Karger's testimony that a single computer would typically run the simulation disclosed in Shoubridge. We, therefore, credit this testimony. Accordingly, we find Petitioner's contention that a person of ordinary skill in the art would have recognized that the simulation of participants in Shoubridge would have typically been implemented on a

[18] As explained with respect to claim 1, the simulation is of a 64 node network, which we agree discloses 64 participants in the network.

computer (i.e., "as hosting more than one participant") to be supported by the record and, therefore, adopt it as our own.

9. Petitioner's Alleged Failure to Provide a Motivation

Patent Owner presents additional arguments against Petitioner's obviousness challenges. To begin with, Patent Owner's generalized contention that Petitioner "failed to explain why a POSITA would want to modify Shoubridge" (PO Resp. 54), is not persuasive because, as explained above, we determine that Petitioner has supported its contentions with respect to each of the challenged claims. We also do not find persuasive Patent Owner's contention that "designing systems at the application layer is completely different than designing systems at the networking layer" (*id.* at 55), because it relies on proposed claim constructions (i.e., "application layer" and "overlay network") that we reject.

Patent Owner also argues that "it was impracticable to implement flooding at the application layer or the network layer in a large system due to the massive bandwidth usage. It was well known at that time that flooding had limited uses and would ultimately cause[] bandwidth issues in a large enough network." *Id.* As discussed above, the claims do not require a "large system," but a system with as few as 6 participants. It is also unclear how "caus[ing] bandwidth issues in a large enough network" is probative of non-obviousness, when the prior art (including Patent Owner's exhibits) acknowledges the limitations of flooding and constrained flooding techniques, yet teaches the use of such techniques even for a "large network." *See* Ex. 1105, 2 ("[C]onstrained flooding [is] the most efficient way to flood an entire network."), 4 ("It is reasonable to conclude that a *large network similar to the one modelled*, would require a flooding

procedure if the network is to operate in a very dynamic, or potentially very dynamic environment." (emphasis added)); Ex. 2037, 623 ("[C]onstrained flood routing is most noted for its robustness."); Ex. 2046, 351.

To this end, Dr. Goodrich's simulation of Shoubridge's network is also not persuasive (*see* PO Resp. 55–56; Ex. 2002 ¶¶ 120–29), because it allegedly shows why Shoubridge's technique is not practical, when its advantages and disadvantages are already well documented in the prior art. The issue is whether, given Shoubridge's disclosure of constrained flooding (which we determine teaches all the limitations of at least the challenged independent claims), a person of ordinary skill in the art would have modified Shoubridge in the ways contemplated by other challenged claims.

Regardless, we have considered Dr. Goodrich's simulation but we do not give it substantial weight. Among other things, Dr. Goodrich fails to sufficiently explain why he simulated a network within a network. According to Dr. Goodrich, his simulation is of "an 8-times-8 Manhattan grid network (with torus wrap-around) as an overlay on top of an 8-times-8 Manhattan grid network with torus wrap-around, which amounts to operating the topology of Shoubridge as an overlay on the Shoubridge network itself." Ex. 2022 ¶ 120. However, by using two networks, an overlay and an underlay, we agree with Petitioner that this simulation amounts to "flooding within flooding." Pet. Reply 13–14 & n.10. That is, it appears that "each time one node passed a message to a neighboring node, Dr. Goodrich also flooded the underlay network" (resulting in over 2 million

messages for 2 original messages/node),[19] without explaining why this would be necessary. *Id.* at 14; Ex. 1125 ¶¶ 99–100. Therefore, we do not find this simulation to be representative of Shoubridge.

For the foregoing reasons, we do not find Patent Owner's contentions regarding the alleged failure of motivation to modify Shoubridge to be persuasive.

10. Objective Indicia of Non-Obviousness

Factual inquiries for an obviousness determination include secondary considerations based on evaluation and crediting of objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The totality of the evidence submitted, including objective evidence of nonobviousness, may lead to a conclusion that the challenged claims would not have been obvious to one of ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–72 (Fed. Cir. 1984).

Secondary considerations may include any of the following: long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17; *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). However, to be given substantial weight, the proponent must demonstrate a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). "Nexus" is a legally and factually sufficient connection

[19] For example, Dr. Goodrich does not explain how 2 million messages were generated. Therefore, we accept Dr. Karger's computation that Dr. Goodrich was flooding both networks as the explanation for this number of messages. *See* Ex. 1125 ¶ 100.

between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

In its Response, Patent Owner presents evidence and arguments as to long-felt need, unexpected results, licensing and commercial success, industry praise, and copying. PO Resp. 56–64. Patent Owner also relies on the declaration of Dr. Bims in support of its contentions. *See* Ex. 2023.

a. Long-felt need and failure of others

Patent Owner contends the "invention solved the central bottleneck problem that occurred in client/server networks, and was able to address problems of management complexity through a broadcast channel that overlays a point-to-point network where each node is connected to some, but not all, neighboring network nodes." PO Resp. 58 (citing Ex. 2023 ¶¶ 26–28, 31). Patent Owner also contends the inventors (Fred Holt and Virgil Bourassa) began trying to solve the problem at the request of Boeing management to allow a peer-to-peer communication platform with more than two users to communicate reliably and with low delay. *Id.* (citing Ex. 2024 ¶¶ 5, 8; Ex. 2025 ¶¶ 4, 7). According to Dr. Bims, Patent Owner contends, this "problem existed for years" prior to the '344 patent. *Id.* (citing Ex. 2023 ¶¶ 26–31).

We do not find this evidence persuasive. To begin with, the proffered evidence must show a long-felt need *recognized by those of ordinary skill in the art. In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). Here, Patent Owner relies on the inventors' recognition of the problem, which does not indicate it was a significant one. *See id.* ("[O]ne may question whether in

fact such a 'problem' objectively existed, as distinguished from its acknowledged subjective existence in the minds of the inventors and their patent counsel."). Although Patent Owner also cites its declarant Dr. Bims's testimony that the problem existed for years, this, too, is based solely on his review of the inventors' declaration and does not independently corroborate the existence of the long-felt need or failure of others. *See* Ex. 2023 ¶¶ 26–28 ("Based on Fred Holt and Virgil Bourassa's declaration, it is my opinion that they were solving a long felt need as the systems at the time did not support the collaboration of many participants in a reliable manner.").

Additionally, we agree Patent Owner provides little evidence of nexus to the claimed invention. *See* Pet. Reply 24. "[O]bjective evidence of non-obviousness must be commensurate in scope with the claims." *Allergen, Inc. v. Apotex Inc.*, 754 F.3d 952, 965 (Fed. Cir. 2014) (quoting *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971)). According to Patent Owner, the problems relating to the alleged long-felt need and failure of others are:

> point-to-point network protocols did not scale as the number of participants increased; client/server middleware systems faced bottleneck performance issues as participants stored information in order to be shared and risked the failure of communications between the clients due to a server failure; multicasting networks were limited to single local-area networks; and peer-to-peer middleware communications systems relied on a user to assemble a point-to-point graph of the connections used for sharing the information and thus were not suitable for the needs of large-scale collaboration. *See* Ex. 2028 (Invention Disclosure); Holt Decl. at ¶¶ 6, 7; Bourassa Decl. at ¶¶ 5, 6.

PO Resp. 58–59. Even accepting these contentions, Patent Owner does not explain which of these problems relate to claim limitations at issue. For

example, there are no claim limitations directed to scaling, large-scale collaboration, or graph assembly by a non-user.

Accordingly, we also find that insufficient nexus has been established between the alleged "long-felt need" and "failure of others" and the claimed invention. Consequently, we accord little weight to Patent Owner's contentions relating to long-felt need and failure by others.

b. Unexpected results

Patent Owner relies on the three years it allegedly took inventors to "identify a solution" as unexpected results. *See* PO Resp. 59 (citing Ex. 2024 ¶¶ 9–26; Ex. 2025 ¶¶ 8–41). According to Patent Owner, "[t]his three-year period consisted of twenty-eight different epiphanies that were not readily apparent based on what was known in the art at that time." *Id.* at 59–60 (citing Ex. 2025 ¶¶ 5–8; Ex. 2023 ¶¶ 32–34).

To begin with, we agree with Petitioner (Pet. Reply 25) that Patent Owner's evidence of the difficulties in identifying a solution is not itself evidence of unexpected results. *See Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (noting that unexpected results requires a showing of some *superior property or advantage* that a person of ordinary skill would have found *surprising or unexpected*).

Nevertheless, we have considered this testimony. We observe that most if not all of the inventors' three-year development and twenty-eight "epiphanies" relate to developing unclaimed features of the system. *See, e.g.*, Ex. 2024 ¶¶ 12–14 (challenge associated with "joining a SWAN session"), ¶ 17 (challenge associated with node departures), ¶ 18 (challenge in enforcing a consistent state with no global reference); *see also* Ex. 2023 ¶¶ 32–34 (discussing inventor testimony). As such, this evidence does not

support a conclusion of non-obviousness. *See U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1562 (Fed. Cir. 1997) (noting evidence of lengthy development was related to unclaimed features). There is no evidence, for example, of any development issues relating to any of the claim limitations that Patent Owner contends would not have been obvious. We conclude, therefore, that insufficient nexus exists between the alleged "unexpected results" and the claimed invention. For the foregoing reasons, we give little weight to Patent Owner's contentions relating to unexpected results.

c. Licensing and commercial success

Patent Owner contends that "the patented invention described in the '344 Patent gained commercial success through its successful licensing of the claimed invention to Sony PlayStation." PO Resp. 60 (citing Ex. 2023 ¶ 10; Ex. 2029). Patent Owner further contends that Sony's PlayStation is a commercial embodiment of the claimed invention of the '344 patent and that it has obtained increased sales as a result of products that practice the recitations of the challenged claims. *Id.* at 60–61 (citing Ex. 2023 ¶¶ 11–13; Ex. 2059 (chart mapping Sony product to licensed patents)).

We have considered Exhibit 2029, which purports to be a license agreement between Boeing Management Company and Sony Computer Entertainment for the '344 patent and related patents. *See* Ex. 2029, 1, 11 ("Attachment A"). We have also considered Dr. Bims's opinion that at least Sony PlayStation is a commercial embodiment of the '344 patent, as evidenced by his claim chart purportedly mapping claim 1 of the '344 patent to PlayStation 3 and PlayStation 4. *See* Ex. 2059. In addition, we have considered Dr. Karger's rebuttal testimony that Dr. Bims's claim chart fails

to show that the PlayStation products meet all of the limitations of claim 1. *See* Ex. 1125 ¶¶ 185–192.

We recognize that there is a presumption of nexus when the asserted objective evidence is tied to a specific product that is an embodiment of the claimed invention. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329–31 (Fed. Cir. 2016). Secondary considerations evidence, however, must relate to the merits of the invention and not extrinsic factors, or features already known in the art. *In re Kao*, 639 F.3d 1057, 1070 (Fed. Cir. 2011); *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1323 (Fed. Cir. 2006). Thus, "[a] nexus may not exist where, for example, the merits of the claimed invention were readily available in the prior art." *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016) (internal quotation marks and citation omitted). Nonetheless, while a nexus may be lacking if the objective evidence "exclusively relates to a feature that was 'known in the prior art,' the obviousness inquiry centers on whether 'the claimed invention as a whole' would have been obvious." *WBIP*, 829 F.3d at 1330 (quoting *Rambus, Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)).

Here, Patent Owner relies solely a chart mapping the limitations of claim 1 to the Sony PlayStation. However, even if the Sony PlayStation products satisfy all the limitations of claim 1, which Petitioner disputes, we are not persuaded a nexus exists between the claimed invention and the license agreement. As explained above, the claimed invention as whole, as recited in claim 1 and other claims, is disclosed in the prior art *as a whole*, i.e., in Shoubridge. In other words, "the merits of the claimed invention were readily available in the prior art." *ClassCo*, 838 F.3d at 1220. Patent Owner does not direct us to any testimony or other evidence that suggests

any limitations of the dependent claims that are not expressly disclosed in Shoubridge were embodied by the licensed product or that these features were important to the license. Thus, this case is distinguishable from *WBIP*, in which the Federal Circuit concluded a jury's presumed factual findings relating to nexus were supported by substantial evidence when the merits of the invention involved a combination of prior elements that were known individually in the prior art. *WBIP*, 829 F.3d at 1331–32.

Patent Owner's commercial success evidence suffers from the same deficiency because it also relates to the PlayStation products. *See* Ex. 2023 ¶¶ 11–12. Consequently, there is no nexus between the alleged success and the merits of the invention.

For these reasons alone, we do not accord substantial weight to Patent Owner's license and commercial success evidence.

Although we find Patent Owner's evidence of nexus to be insufficient, we also have considered its "commercial success" based on Sony's game division allegedly experiencing an increase of about 267 billion yen for the fiscal year ending March 31, 2008, and an increase in sales of PlayStation 3 from 5.63 million units to 9.24 million units over the same period. PO Resp. 61 (citing Ex. 2023 ¶ 14; Ex. 2060). Even assuming these numbers are accurate, a necessary component of the commercial success inquiry is determining market share associated with the alleged product, relative to competing products. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012). Here, without market share, or a sense of the total market, we cannot evaluate the significance of the increased sales amounts. *See id.* ("[T]he number of units sold without evidence of the market share is only weak evidence of commercial success . . . ."). For example, we do not know

whether PlayStation 3's improvement in raw sales (an increase of 5.63 million units to a total of 9.24 million units) amounted to an increase in market share or whether the total market also increased proportionately.

Dr. Bims states that "[i]t is my opinion that the increase in sales were due in part because of Sony's license to the '344 Patent. These sales are indicative of the commercial success of the inventions disclosed in the '344 Patent because Sony has utilized the invention in products that have been commercially successful." Ex. 2023 ¶ 14. However, in the absence of further evidence, we find this reasoning to be conclusory as well as circular.[20] Thus, we give little weight to Patent Owner's commercial success arguments for these additional reasons.

d. Industry praise

Patent Owner contends that there was industry praise for the '344 patent as evidenced by Boeing's initiative to identify internal technologies that had commercial potential, which selected SWAN (an alleged embodiment of the '344 patent) as a leader in the portfolio of possible spin-out companies. PO Resp. 62 (citing, e.g., Ex. 2024 ¶ 27). Petitioner contends that Boeing's own "self-referential commendation" of the technology does not demonstrate industry praise. Pet. Reply 26 (quoting *Bayer Healthcare Pharms. v. Watson Pharms.*, 713 F.3d 1369, 1377 (Fed. Cir. 2013)).

We agree with Petitioner. While "praise in the industry for a patented invention, and specifically praise from a competitor, tends to indicate that

[20] We also observe that Dr. Bims does not have any obvious qualifications as an economics expert (*see* Ex. 2023 ¶¶ 2–4 (describing graduate education in electrical engineering), Appendix A).

the invention was not obvious, *self-serving statements from researchers about their own work do not have the same reliability.*" *In re Cree*, 818 F.3d 694, 702 (Fed. Cir. 2016) (internal quotation marks and citation omitted) (emphasis added) (agreeing that the Board was correct to discount self-recognition of inventor's own work). Consequently, we do not consider Boeing's effort to promote the work of its inventors as objective evidence of industry praise.

We have also considered Patent Owner's contention that cites to the '344 patent in ***"almost 90 other patent applications"*** by well-known companies represents praise. PO Resp. 62 (citing Ex. 2023 ¶¶ 21–24; Ex. 2064). Patent Owner's declarant adds that "it is my opinion that the '344 Patent describes what the industry now calls 'peer-to-peer relay' technology" and "citation of the '344 Patent by companies in the gaming industry demonstrates the significance of the invention described in the '344 Patent." Ex. 2023 ¶¶ 21, 23.

We do not find this evidence persuasive of praise. First, Patent Owner's reliance on "bare . . . citations" to the '344 patent by other patents are not suggestive of true praise. *See Bayer Healthcare*, 713 F.3d at 1377 (finding that brief discussions of Patent Owner's product in journal articles "fall well short of demonstrating true industry praise"). Second, Dr. Bims's statements regarding praise of the '344 patent rely primarily on the same list of bare citations. Although Dr. Bims quotes a three-sentence summary of the '344 patent from one later patent, this brief description of the '344 patent does not rise to the level of "praise." Ex. 2023 ¶ 22 (citing Ex. 2090). For these reasons, we give little weight to Patent Owner's contentions relating to industry praise.

e. Copying

Patent Owner contends that Sony, after meeting with Boeing about the technology disclosed in the '344 patent, filed applications for patents that are "essentially identical" to the '344 patent. PO Resp. 62–63 (citing Ex. 2024 ¶ 28; Ex. 2023 ¶ 15; Exs. 2040 and 2041 (Sony patents)). According to Patent Owner, Sony's patents are "strong evidence" that Sony copied the invention described in the '344 patent. *Id.* at 63. We disagree.

First, Patent Owner's evidence belies its assertion that the Sony patents are essentially identical to the '344 patent. *See* Ex. 2024 ¶ 28 (Dr. Holt testifying that the Sony patents "contain similar technology" as Patent Owner's SWAN patents). Moreover, "copying *requires evidence of efforts to replicate a specific product*, which may be demonstrated through internal company documents, direct evidence such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a replica, *or access to the patented product combined with substantial similarity to the patented product.*" *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) (emphases added). Here, Patent Owner points to no persuasive evidence that the Sony patents embody any actual products. A comparison of patents is insufficient evidence of copying.

Patent Owner also contends that "Petitioner's products are embodiments of the patented invention described in the '344 Patent." PO Resp. 63. In support, Patent Owner cites Dr. Bims's declaration, which in turn cites Exhibits 2061, 2062, and 2063, which Dr. Bims represents as "infringement contentions filed in the parallel district court proceedings." Ex. 2023 ¶¶ 16–20. Reliance solely on infringement contentions, however,

is insufficient to demonstrate copying because "otherwise, every infringement suit would automatically confirm the nonobviousness of the patent." *Wyers*, 616 F.3d at 1246 (internal quotations and citations omitted). Here, in his declaration, Dr. Bims cites the entirety of Patent Owner's lengthy infringement contentions as evidence of copying and provides a similar statement for each of the accused products that, for example, "these games have certain modes which allow individual players that are in different locations to communicate with each other using a broadcast channel in an underlying network." Ex. 2023 ¶ 18; *see also id.* ¶¶ 17, 19 (providing similar statements regarding other products). Dr. Bims does not cite specific evidence, for example, of similarities between the accused product and Patent Owner's product that would tend to show copying.

For these reasons, we give little weight to Patent Owner's contentions relating to copying.

11. Legal Conclusion of Obviousness

We have considered Patent Owner's evidence of non-obviousness in addition to Petitioner's showing above regarding the subject matter of claims 1–19 in view of Shoubridge. We find the evidence supports giving the proposed objective indicia of non-obviousness little weight overall. Considering the evidence as a whole, including Petitioner's rationales in support of its contentions that the limitations of claims 1–19 are unpatentable, either because a person of ordinary skill in the art would have recognized that Shoubridge teaches or suggests the relevant limitations or because the relevant limitations would have been obvious modifications for such an artisan, we are persuaded that Petitioner has established by a

preponderance of the evidence that claims 1–19 would have been obvious in view of Shoubridge.

III. CONTINGENT MOTION TO AMEND

In its Contingent Motion to Amend, Patent Owner seeks to substitute claim 1 with claim 20, claim 7 with claim 21, and claim 8 with claim 22, but only if the original claims are determined to be unpatentable. Mot. Am. 2; Reply Mot. Am. 1. For the reasons that follow, we determine that substitute claims 20 and 22 are unpatentable, but that claim 21 is patentable over the prior art of record.

A. Substitute Claims

Patent Owner's proposed substitute claims are set forth below "with: (1) underlining indicating inserted text, (2) italics indicating claim language previously incorporated by reference via a dependency clause and now explicitly recited, and (3) strikethrough indicating deleted text." Mot. Am. 4.

> 20. (Proposed Substitute for Claim 1) A dynamic, overlay computer network ~~for providing~~ that overlays an underlying network and provides a game environment for a plurality of gaming participants, each gaming participant being a gaming application program each gaming participant having connections to at least three neighbor gaming participants through a broadcast channel,
>
> wherein an originating gaming participant sends gaming data to the other gaming participants by sending the gaming data through each of its connections to its neighbor gaming participants and wherein each gaming participant sends gaming data that it receives from a neighbor gaming participant to its other neighbor gaming participants,

further wherein the dynamic, overlay computer network is m-regular, where m is the exact number of neighbor gaming participants of each gaming participant, ~~and~~

further wherein the number of gaming participants is at least two greater than m thus resulting in a non-complete graph, and

further wherein the gaming data includes an action in the game broadcast on the broadcast channel.

21. (Proposed Substitute for Claim 7) ~~The computer network of claim 1~~ *A computer network for providing a game environment for a plurality of* gaming *participants, each* gaming *participant having connections to at least three neighbor* gaming *participants,*

wherein an originating gaming *participant sends* gaming *data to the other* gaming *participants by sending the* gaming *data through each of its connections to its neighbor* gaming *participants and wherein each* gaming *participant sends* gaming *data that it receives from a neighbor* gaming *participant to its other neighbor* gaming *participants,*

further wherein the network is m-regular, where m is the exact number of neighbor gaming *participants of each* gaming *participant, ~~and~~*

further wherein the number of gaming *participants is at least two greater than m thus resulting in a non-complete graph,*

further wherein the connections between the gaming participants are peer-to-peer connections,

further wherein the network is formed through a broadcast channel that overlays an underlying network,

further wherein the game environment is provided by at least one game application program executing on each computer of the computer network that interacts with the broadcast channel, and

further wherein gaming participants can join and leave the network using the broadcast channel.

22. (Proposed Substitute for claim 8) ~~The computer network of claim 1~~ A dynamic, overlay *computer network for providing a game environment for a plurality of* gaming

> *participants,* each gaming participant being a gaming application program, *each gaming participant having connections* through the dynamic, overlay computer network *to at least three neighbor* gaming *participants,*
>
> *wherein an originating* gaming *participant sends* gaming *data to the other* gaming *participants by sending the* gaming *data through each of its connections to its neighbor* gaming *participants and wherein each* gaming *participant sends* gaming *data that it receives from a neighbor* gaming *participant to its other neighbor* gaming *participants,*
>
> *further wherein the* dynamic, overlay *computer network is m-regular, where m is the exact number of neighbor* gaming *participants of each* gaming *participant,*
>
> *further wherein the number of* gaming *participants is at least two greater than m thus resulting in a non-complete graph,*
>
> further wherein the game environment is provided by at least one game application program executing on each computer of the dynamic, overlay computer network that interacts with a broadcast channel,
>
> further wherein the dynamic, overlay network overlays an underlying network which contains underlying network connections, and
>
> further wherein the underlying network connections are TCP/IP connections.

Mot. Am. 28–30 (formatting added).

B. Claim Interpretation

Patent Owner proposes constructions for several terms that it reasonably anticipates as being subject to dispute. Mot. Am. 5. Specifically, Patent Owner proposes construing "gaming participant," "gaming data," "overlay computer network that overlays an underlying network," "game

environment," "broadcast channel," "connection," and "dynamic, overlay computer network." *Id.* at 5–9.

As a general matter, Petitioner contends Patent Owner is seeking to use claim construction to add claim requirements, such as "application-layer," "application program," or "logical broadcast channel that overlays an underlying network," that are not reasonably supported by the written description of the '344 patent. Opp. Mot. Am. 1–2. As an example, Petitioner contends "[the] '344 [patent] gives no indication that the disclosed overlay network is at the application layer (*cf.* Mot. [Am.]7)—nor would POSITA perceive one (Ex1124 ¶ 269). [The] '344 lacks any discussion of network layers, the OSI layer constructs or operation at the 'application layer.' Ex1124 ¶269." Opp. Mot. Am. 2. We agree with Petitioner.

To begin with, it bears pointing out that Patent Owner could have proposed substitute claims that explicitly recited the requirements it now seeks to add through claim construction. In any event, for reasons substantially similar to those discussed above (*see supra* § II.C), we agree with Petitioner that the proposed constructions are inconsistent with the specification of the '344 patent. For emphasis, we refer specifically to the above claim construction discussion of the terms "participant" and "connection," in which we determined that adding an "application program" or "application-layer" requirement was not consistent with the broadest reasonable interpretation of these terms given their usage in the specification. *See supra* § II.C.4–5. Moreover, in view of our findings

below regarding the teachings of the prior art, we determine that it is unnecessary to further construe the terms proposed by Patent Owner.[21]

C. Whether Substitute Claims Are Patentable

1. Claims 20 and 22

In its proposed substitute claim 20, as shown above, Patent Owner adds limitations to original claim 1, requiring the computer network to be a "dynamic, overlay computer network that overlays an underlying network and provides a game environment." Claim 20 also requires "gaming participants," each of which is a "gaming application program" and has connections to other gaming participants "through a broadcast channel." Finally, claim 20 requires the gaming participants to send "gaming data" that "includes an action in the game broadcast on the broadcast channel." In proposed substitute claim 22, Patent Owner adds similar limitations to original claim 8, including a "dynamic, overlay computer network for providing a game environment" that "overlays an underlying network," as well as "gaming participants," each of which is a "gaming application program," and "each computer of the computer network that interacts with a broadcast channel."

[21] We reject Petitioner's argument that Patent Owner's attempt to add new matter, through claim construction, amounts to a failure to provide written description support for its proposed substitute claims in contravention to 37 C.F.R. § 42.121(b)(1). *See* Opp. Mot. Am. 1. Rather, as required by our precedents (*see, e.g.*, *MasterImage 3D, Inc. v. RealD Inc.*, Case IPR2015-00040 (PTAB July 15, 2015) (Paper 42) (precedential)), we find Patent Owner has sufficiently set forth the written description support it relies upon for its substitute claims. *See* Mot. Am. 11–15.

According to Patent Owner, the prior art of record (including Lin, DirectPlay,[22] and Shoubridge) does not teach these additional limitations.[23] Mot. Am. 17–23. For example, Patent Owner contends Shoubridge does not teach "an overlay network [as an] m-regular incomplete graph at the application layer," but only discloses a simulation operating at the network layer, as admitted by Dr. Karger. *Id.* at 20–21 (citing, e.g., Ex. 2032, 102:22–103:4). Moreover, Patent Owner argues that a person of ordinary skill would not have been motivated to modify Shoubridge for gaming applications because it places robustness and reliability over latency, "which is detrimental to multiplayer game environments." *Id.* at 21 (citing Ex. 2095 ¶ 76).

Petitioner argues that the substitute claims including the additional limitations are rendered obvious by at least Shoubridge (Ground 4) or

[22] Lin and DirectPlay are cited in, e.g., IPR2015-01970, Paper 2. However, in the Final Written Decision in that proceeding, we have determined that Lin was not shown to be a publicly accessible printed publication under 35 U.S.C. § 102(a).

[23] As a procedural matter, in discussing Lin, DirectPlay, and Shoubridge, as well as other references of record, we find that Patent Owner has sufficiently addressed material prior art of record known to Patent Owner as it relates to each added limitation as required by *MasterImage*. *See* Mot. Am. 16–23 (addressing prior art raised in the proceedings as well as prior art identified during prosecution).

Shoubridge and Gautier[24] (Ground 5). Opp. Mot. Am. 7–8. First, regarding the requirement in claims 20 and 22 for a "dynamic, overlay computer network" that "overlays an underlying network," Petitioner contends that a person of ordinary skill in the art would have found it obvious to implement Shoubridge's grid network as a dynamic overlay over an underlying communication network, such as the Internet, which would form the links of the overlay network. *Id.* at 13 n.12; *see* Ex. 1125 ¶¶ 234–35.

We find Petitioner's contentions persuasive. Irrespective of whether Shoubridge fails to explicitly disclose an overlay network (*see* Mot. Am. 21; Reply Mot. Am. 7), it does not follow that "[b]y failing to show that Shoubridge applies to the application layer, Petitioner has failed to show that Shoubridge would render . . . obvious the substitute claims." Reply Mot. Am. 7. Instead, the question is whether it would have been obvious to use Shoubridge's network as an overlay based on Shoubridge's teachings alone or in combination with other references. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981). We determine that it would be.

Dr. Karger testifies that a person of ordinary skill in the art would have implemented the communications network of Shoubridge as an overlay without having to make changes to the underlying network infrastructure, with the Internet being an obvious choice as the underlying network, and

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[24] Laurent Gautier & Christophe Diot, *Design and Evaluation of MiMaze, a Multi-Player Game on the Internet*, IEEE INT'L CONF. ON MULTIMEDIA COMPUTING & SYS. 233–36 (1998) (Ex. 1149) ("Gautier"). Although citing Ex. 1130 in its Opposition, Petitioner filed two versions of Gautier, authenticated by separate witnesses (*see* Ex. 1130 and Ex. 1149 (authenticated in Ex. 1132)); however, because the contents of these two references are substantially the same in relevant part, we focus on Exhibit 1149 herein.

that such an implementation would work as expected. Ex. 1125 ¶ 115. By way of example, Dr. Karger contends that application-level overlays were routinely used for a "wide array of applications on the Internet." *Id.* ¶ 20 (describing Ex. 1144[25]); *id.* ¶ 116 (citing Ex. 1144); *id.* ¶ 244 (citing Exs. 1144 and 1130). We find this testimony credible. McCanne describes applications such as video, audio conferencing, and whiteboard conferencing implemented using the Internet as an underlying network. Ex. 1144, 33. McCanne relies on a multicast backbone as the "overlay network" (*see id.* ("virtual multicast 'overlay' network")) using internet protocols as the underlying network (*see id.* at 39 ("RTP session" as "underlying transport channels"). McCanne also discloses that group membership can be dynamic, allowing participants to join and leave. *See id.* at 34, Fig. 1. In addition, Gautier provides an example of a gaming application supported on the multicast backbone described in McCanne. *See* Ex. 1130, Abstract; Ex. 1149, Abstract. Thus, Dr. Karger's testimony that dynamic, application-level overlays were routinely used is supported by evidence of record.

We have considered Dr. Goodrich's response to this testimony (*see* Ex. 2104 ¶ 27), but do not give it substantial weight. For example, Dr. Goodrich testifies that "Shoubridge [and others] describe systems that are not at the application layer and are instead at the lower network layer, in terms of the OSI layering hierarchy. Petitioner does not describe how to modify Lin or Shoubridge, nor McCanne or Gautier, so as to create a functional system." *Id.* We disagree. As discussed above, Dr. Karger's

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[25] Steven McCanne, *Scalable Multimedia Communication: Using IP Multicast and Lightweight Sessions*, IEEE INTERNET COMPUTING, Vol. 3, Issue 2, 33–45 (1999) (Ex. 1144) ("McCanne").

testimony is that a person of ordinary skill would have recognized that at least Shoubridge's network could operate as an application layer overlay for the purpose of a wide-array of applications (as discussed, for example, in McCanne[26]) using the Internet as an underlying network. Although Dr. Goodrich states that Dr. Karger did not explain how such a modification would function, we disagree. According to Dr. Karger, by "forwarding user traffic," the network of participants in Shoubridge creates an environment for sharing information (e.g., a game environment). Ex. 1125 ¶ 118. Thus, Dr. Karger's testimony that Shoubridge would have worked as expected as an overlay for an information sharing application (e.g., such as McCanne's whiteboard, the '277 patent's database, or a gaming application as taught in Gautier) is supported. *See KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.").

Dr. Goodrich further testifies that "a POSITA would be at [a] loss as to how to replicate with Lin or Shoubridge the many protocols that are referenced by McCanne as occurring at higher levels in the OSI hierarchy, including IGMP, PIM, DVMRP, CBT, LWS, RTP, and RTCP" and "since the Mbone described in Gautier is not an m-regular network, technologies such as Scalable Pruning Mechanism are incompatible with m-regular networks." Ex. 2104 ¶ 27. We do not give Dr. Goodrich's testimony

[26] Another example provided by Dr. Karger is U.S. Patent No. 6,122,277, which, according to Dr. Karger, discloses a distributed database application using a communication fabric such as a 4-regular torus network. *See* Ex. 1125 ¶ 127 (citing Ex. 1116, 13:57–67).

substantial weight because his testimony is based on an assumption that obviousness is based on whether Shoubridge bodily incorporates McCanne's or Gautier's system in its entirety as opposed to what a person of ordinary skill in the art would have understood Shoubridge to teach in view of teachings from other references. *See Keller*, 642 F.2d at 425. Accordingly, having credited Dr. Karger's testimony in support of Petitioner's contentions, we agree Shoubridge, at least in view of McCanne and Gautier, teaches a "dynamic, overlay computer network that overlays an underlying network and provides a game environment," and similar limitations of claim 22.

Claim 20 also recites that "each gaming participant . . . having connections to [other] participants through a broadcast channel." Claim 22 recites that "each computer of the dynamic, overlay computer network . . . interacts with a broadcast channel." Petitioner contends the grid network of Shoubridge is "a broadcast channel." Opp. Mot. Am. 13, 16 ("Shoubridge . . . teaches 'nodes' interacting with a logical broadcast channel"), 19 n.17. We agree. As discussed above (*see supra* § II.C.3), the '344 patent uses a network graph to represent a broadcast channel. *See* Ex. 1101, 4:4–7 ("The broadcasting of a message over the broadcast channel is effectively a multicast to those computers of the network that are currently connected to the broadcast channel."); 4:49–52; 5:6–7. Consequently, we find that Shoubridge's grid network, which consists of nodes forwarding user traffic (e.g., application data as disclosed in McCanne) to the other nodes, discloses each participant having connections to other participants "through a broadcast channel" (claim 20) and "each computer of the

dynamic, overlay network that interacts with a broadcast channel" (claim 22).

Claims 20 and 22 recite "each gaming participant being a gaming application program." Petitioner contends that Shoubridge teaches a computer network that provides an environment for a plurality of participants, each participant being an application program (e.g., an application running on a node). Opp. Mot. Am. 21 (citing Ex. 1105, 1); Ex. 1125 ¶ 252. Petitioner cites MiMaze, a distributed multiplayer game on the Internet described in Gautier, as an example of a game environment for a plurality of gaming participants in which each gaming participant is a gaming application program executing on a computer. Opp. Mot. Am. 22 (citing Ex. 1130, Abstract, 2, 6); Ex. 1125 ¶ 253. According to Dr. Karger, a person of ordinary skill in the art would have found it routine and straightforward to implement a gaming application as an application running on Shoubridge's network nodes. Ex. 1125 ¶ 255.

As discussed above, we credit Dr. Karger's testimony that Shoubridge would have worked as expected as an overlay for an information sharing application, such as a gaming application. We have considered Dr. Goodrich's responsive testimony (*e.g.*, Ex. 2104 ¶ 56 ("Gautier neither teaches nor discloses an m-regular network and . . . did not utilize flood routing algorithms as discussed in Shoubridge . . . ."), but we do not give it substantial weight because it, too, is based on an assumption that obviousness is based on whether Shoubridge bodily incorporates Gautier's system in its entirety rather than what a person of ordinary skill in the art would have understood Shoubridge to teach in view of Gautier. *See Keller*, 642 F.2d at 425. Accordingly, having credited Dr. Karger's testimony, we

agree that Shoubridge, in view of Gautier's gaming application, which is similar to overlay applications described in McCanne, teaches "each gaming participant being a gaming application program," as recited in claims 20 and 22.

Claim 20 also requires that "gaming data includes an action in the game broadcast on the broadcast channel." Claim 22 has no corresponding limitation. According to Petitioner, Gautier discloses that gaming data (e.g., "Application Data Units") includes an action in the game (e.g., "shooting and collisions") broadcast to other players. Opp. Mot. Am. 24 (citing Ex. 1130, 4, Figs. 2 & 3); *see* Ex. 1125 ¶ 260. As discussed above, Shoubridge's grid network is a "broadcast channel" on which nodes forward user traffic (e.g., application data such as gaming data in Gautier's gaming application). Thus, Shoubridge in view of Gautier teaches this limitation.

Claim 22 recites that "the underlying network connections are TCP/IP connections." Similar to its arguments for claim 8, Petitioner contends a person of ordinary skill in the art would have used TCP as one of a finite number of predictable solutions. Opp. Mot. Am. 25 (citing *KSR*, 550 U.S. at 421; Ex. 1125 ¶ 263). Patent Owner argues that "Gautier teaches away from using the TCP/IP protocol because it is 'unrealistic to use [the DIS standard] protocol over the Internet.' Gautier at 4. While Petitioner does not even argue that Gautier teaches this element, it does not address the teaching away from Gautier." Reply Mot. Am. 12.

Patent Owner's argument is not persuasive because Petitioner does not bodily incorporate Gautier into Shoubridge but instead, as discussed above, relies on Gautier for its teaching regarding multiplayer gaming applications as exemplifying the use of Shoubridge's network. Moreover, as

also noted above, a person of ordinary skill in the art would have understood the tradeoffs between TCP and RTP/UDP depending on the application. *See* Ex. 1125 ¶ 155 ("[A] POSITA would have selected between TCP if seeking robust transport mechanism . . . or UDP if seeking a simpler protocol . . . with fewer guarantees."). Accordingly, we find that a person of ordinary skill in the art would have used TCP as the transport protocol for the underlying network as required by Claim 22.

We have considered Patent Owner's evidence of non-obviousness as set forth above (*see supra* § III.E.6) in light of the substitute claims 20 and 22 that Patent Owner proposes here. Specifically, we determine that our analysis regarding the sufficiency of the proffered evidence of secondary considerations above applies to claims 20 and 22. In addition, Patent Owner has not presented argument or evidence showing a nexus between the alleged secondary considerations and the invention of claims 20 and 22. Consequently, Patent Owner's additional evidence of non-obviousness is entitled to little weight. Considering the evidence as a whole, we are persuaded that claims 20 and 22 are unpatentable as obvious in view of Shoubridge and additional references as explained above.

2. Claim 21

Claim 21 recites similar limitations to those discussed above (e.g. a game environment for a plurality of gaming participants and a broadcast channel). Claim 21 also recites that "gaming participants can join and leave the network using the broadcast channel." Petitioner contends a person of ordinary skill in the art would have recognized that "using Gautier's 'IP multicast model' players can join and leave the game through the broadcast model." Opp. Mot. Am. 14 n.14 (citing Ex. 1124 ¶ 284). Petitioner also

relies on disclosures of Lin, DirectPlay, and Shoubridge as teaching this limitation. *Id.* at 18 (citing Ex. 1124 ¶ 292; Ex. 1125 ¶ 245); *see also id.* at 12–13 (discussion of the limitation "formed through a broadcast channel").

We have considered Petitioner's charts purporting to map the disclosures of Lin, DirectPlay, Shoubridge, and Gautier to the recited limitation, and agree with Patent Owner that none of the references teach or suggest the ability to join or leave *using the broadcast channel*.[27] Reply Mot. Am. 10 (citing Ex. 2104 ¶¶ 44–50). Regarding Gautier, we observe that Petitioner's argument that it discloses this limitation is based on page 2's description that "[p]articipants join and leave the session dynamically" (*see* Opp. Mot. Am. 20), but Petitioner does not address the statement on page 2 that "*a server is only used when a new entity joins a session*, e.g., to learn the session group address and to download the maze" (Ex. 1149, 233 (emphasis added)). However, this aspect of Gautier's network (i.e., that includes the server) is not a peer-to-peer network as claim 21 also requires of its broadcast channel (i.e., the "connections . . . are peer-to-peer connections"). *See* Ex. 1149, Fig. 2 ("MiMaze architecture"). In other words, new participants do not join "using the broadcast channel."[28] Petitioner does not account for the incompatibility between this aspect of Gautier's teachings and the proposed claims.

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[27] Although we determine that Petitioner has not shown Lin is available as prior art to the '344 patent, *see* IPR2015-01970 (Final Written Decision), we consider Petitioner's arguments here regarding Lin for completeness.

[28] Nor can the joining participant use the broadcast channel, because, in Gautier's system, the new participant must obtain the session group address from the server. Ex. 1149, Fig. 2.

For similar reasons, we find that Petitioner's reliance on DirectPlay is also misplaced. For example, Petitioner cites DirectPlay's statement that "you also need to consider the more mundane work of managing a session in progress. For instance, how will players join and leave game sessions?" Ex. 1103, 122. This statement only suggests the problem of accommodating participants who join and leave the session, and avoids addressing how this is accomplished. Moreover, other sections of DirectPlay explain that "DirectPlay can be a little bit of both [peer-to-peer and client/server], as shown in Figure 18–3." *Id.* at 22. In the peer-to-peer discussion on the next page, DirectPlay explains that a new participant must contact the session host (e.g., Player #1) to obtain "the session's name and other information." *Id.* at 23. Once that participant connects to the host, it receives a list of other DirectPlay objects (i.e., other participants) whereupon it no longer routes messages through the message host. *Id.* In other words, like Gautier, the suggestion is at least that peer-to-peer connections forming the broadcast channel are not used until after a new participant joins the overlay network. Accordingly, like Gautier, we find DirectPlay to be incompatible with claim 21.

We have also considered Dr. Karger's opinion as to how the foregoing references teach or suggest the recited limitation. *See, e.g.*, Ex. 1125 ¶ 242 ("[I]t would have been an obvious implementation choice for a participant to advantageously inform other participants in the network of its arrival or departure using the broadcast channel . . . ."). However, in both Gautier and DirectPlay, new participants seeking to join must contact either a server or a session host to obtain information sufficient to join the broadcast channel. As such, the only teachings evident in the record describe a centralized

mechanism for joining that involves a connection outside of the broadcast channel before joining. In view of these alternative teachings of both DirectPlay and Gautier, which neither Petitioner nor Dr. Karger addresses, we determine Dr. Karger's opinion that it would have been an obvious implementation choice to use the broadcast channel to join or leave the network is conclusory and entitled to little weight.

Finally, we have considered the cited portions of Shoubridge and Lin, but while we agree each teaches a dynamic network, we find both references to be silent on how new participants join or leave the network. *See* Opp. Mot. Am. 12–14, 19–20. For example, regarding Lin, Dr. Karger relies on the statement that "one can use reliable broadcast based on the old set of processors to disseminate the new set of processors" (Ex. 1004, 24) as teaching or suggesting joining or leaving the network using the broadcast channel. *See* Ex. 1124 ¶ 293. This statement, however, does not address a processor joining the network, just that, once joined, the broadcast protocol is used. Nor does it address leaving the network at all. Consequently, we find Dr. Karger's testimony on this point to be conclusory.

For at least these reasons, we determine that Petitioner has not rebutted Patent Owner's showing that its proposed substitute claim 21 is patentable over the prior art.

IV. MOTIONS TO EXCLUDE

A. Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude, Paper 81 ("PO Mot. Exc."), Petitioner filed an Opposition, Paper 88 ("Pet. Opp. Mot. Exc."), and Patent

Owner filed a Reply, Paper 98 ("PO Reply Mot. Exc."). For the reasons that follow, we deny the motion in part and dismiss the motion in part as moot.

1. Scope of Reply Objections

Patent Owner contends Exhibits 1125, 1126, 1128, 1130, 1136–1138, 1131, 1144, and 1145 should be excluded as exceeding the proper scope of reply. PO Mot. Exc. 1–5. A motion to exclude ordinarily is not the proper mechanism for raising the issue of whether a reply or reply evidence is beyond the proper scope permitted under the rules, as a motion to exclude is for challenging the "admissibility of evidence" under the Federal Rules of Evidence. 37 C.F.R. §§ 42.62, 42.64; Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,758, 48,767 (Aug. 14, 2012). However, as indicated above, we have considered whether the foregoing exhibits (to the extent they are relied upon) exceed the proper scope of a reply, and we conclude they do not.

2. Objections to Dr. Karger's Declarations

Patent Owner contends Exhibits 1119, 1125, and 1145 (i.e., Dr. Karger's Declarations) should be excluded under FRE 702, because his opinions are conclusory, do not disclose underlying facts or data in support of his opinions, and are unreliable. PO Mot. Exc. 5–7. In particular, Patent Owner contends Dr. Karger did not have an understanding of the scope of the claims and did not consider secondary considerations in forming his preliminary obviousness analysis. *Id.* As to Exhibit 1145, we dismiss the motion as moot because we do not rely on it. As to Exhibits 1119 and 1125, we deny the motion because, as noted above, we do not agree that Dr. Karger did not have an understanding of the scope of the claims, nor do we require an expert declarant to consider secondary considerations in

performing his initial analysis (i.e., before Patent Owner presents evidence of secondary considerations).

3. Objections to Dr. Shoubridge's Declarations

Patent Owner contends Exhibits 1120 and 1136 (i.e., Dr. Shoubridge's Declarations) should be excluded under FRE 401–402 because they are "conclusory and unreliable." PO Mot. Exc. 8. However, we addressed the credibility of Dr. Shoubridge's Declarations and gave them appropriate weight (*see supra* § II.D.2). Accordingly, they are not inadmissible under FRE 401–402, and we, therefore, deny the motion.

4. Mr. Grenier's Declarations

Patent Owner contends Exhibit 1141, 1144, and 1132 (Mr. Grenier's Declarations regarding Shoubridge, McCanne, and Gautier, respectively) should be excluded because he failed to authenticate the respective references (FRE 901) and had no personal knowledge of the facts stated in his declarations (FRE 602). PO Mot. Exc. 9. Patent Owner also states that "Mr. Grenier testified that IEEE was not available until the mid-2000's, which is after the relevant time frame at issue here." *Id.* (citing Ex. 211[0], 14:15–20).[29]

As to Exhibit 1141, we dismiss the motion as moot because we do not rely on Mr. Grenier's testimony in support of the availability of Shoubridge. Regarding Exhibits 1132 and 1144, we have reviewed these declarations and we disagree that he failed to authenticate the references, which are attached as exhibits to the respective declarations. Rather, as a custodian of records for IEEE, we find that Mr. Grenier provided testimony sufficient to show

[29] Patent Owner mistakenly cites Exhibit 2111.

that the publications (i.e., Gautier and McCanne, respectively) are what they purport to be, IEEE publications.[30] *See* FRE 901(a). We also find that Mr. Grenier's testimony sufficiently demonstrates his personal knowledge of the business practices of IEEE for him to testify regarding these practices. *See* FRE 602.

Finally, regarding Patent Owner's contention that "IEEE was not available until the mid-2000's," we find this is a mischaracterization of the testimony. First, the actual testimony is that the "IEEE *Digital Library*" was first made available in "June of 2000," which is not the same as testifying that *IEEE* was not available until the *mid-2000's*.[31] Ex. 2110, 14:15–20. Second, it is not necessary to rely on the *online* availability of the reference, because Mr. Grenier's testimony is that the references were available well before the relevant time frame, either on the last day of the conference in the case of Gautier (*see* Ex. 1132 ¶ 11 (conference date: July 1, 1998)) or no later than the last day of the second stated publication month in the case of McCanne (*see* Ex. 1144 ¶ 11 (publication month: March-April, 1999)). Accordingly, for the foregoing reasons, we deny the motion to exclude as to Exhibits 1132 and 1144.

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[30] Patent Owner does not provide support for its contention that Gautier is not an IEEE article. *See* PO Mot. Exc. 9. Mr. Grenier provided credible, unrebutted testimony that the article attached to his declaration (Exhibit 1132, Exhibit A), which is the same as Exhibit 1149, was a proceeding presented at the 1998 IEEE International Conference on Multimedia Computing and Systems, July 1, 1998. Ex. 1132 ¶ 8.

[31] June of 2000 is before, not "after the relevant time frame at issue here" (PO Mot. Exc. 9). *See* Ex. 1101, at [22] ("Filed: July 31, 2000").

5. Shoubridge

Patent Owner contends Exhibit 1105 (Shoubridge) should be excluded as unauthenticated, hearsay, and irrelevant. PO Mot. Exc. 10–13 (citing FRE 901, 801–803, 401–403). However, we observe that Patent Owner's contentions are substantially the same as those raised above regarding Shoubridge's status as a publicly available reference (*see supra* §§ II.D.2, IV.A.3). Because we determined above that Shoubridge was authenticated by a credible witness (i.e., Dr. Shoubridge) with personal knowledge of the time and circumstances of its public availability (*see id.*), Patent Owner's motion is denied as to Exhibit 1105.

6. Exhibits 1149–1151

Patent Owner contends Exhibits 1149 (library version of Gautier), 1150 (a website page), and 1151 (FTP directory) are not relevant because these exhibits are relied upon to establish the availability of Exhibit 1130—a different version of Gautier. PO Mot. Exc. 14–15. However, as noted above, we rely on Exhibit 1149 (authenticated by Mr. Grenier in Exhibit 1132) in lieu of Exhibit 1130 and, therefore, Exhibit 1149 is relevant. We, therefore, deny the motion as to Exhibit 1149 and dismiss the motion as to Exhibits 1150 and 1151, which we do not rely on, as moot.

7. Objections to Other Exhibits

Patent Owner contends Exhibit 1126 (Dr. Bennett's Declaration), Exhibit 1104 (Mr. Little's Declaration), Exhibit 1130 (version of Gautier), and Exhibit 1131 (Ms. Stansbury's Affidavit) should be excluded. PO Mot. Exc. 8–10, 13–14. However, because we have not relied on Exhibits 1126, 1104, 1130, and 1131, we dismiss the motion as moot as it relates to these exhibits.

8. Uncited Exhibits

Patent Owner contends Exhibits 1102–1104, 1106, 1108–1118, 1121, 1123, 1124, 1126–1129, 1131–1133, 1135–1143, 1145, and 1149–1151 should be excluded because Petitioner does not rely on them in either its Opposition or Reply and, therefore, they are irrelevant or inadmissible under FRE 401–402 and highly prejudicial under FRE 403. PO Mot. Excl. 15. However, because we have not relied on at least Exhibits 1102–1104, 1108–1115, 1117, 1118, 1121, 1123, 1126–1129, 1131–1133, 1135, 1138–1143, 1145, 1150–1151, we dismiss the motion to exclude as moot as to these exhibits.

As to the remaining exhibits, there is no requirement that Petitioner must cite evidence in its Reply or Opposition to be relevant. *See* 37 C.F.R. § 42.64(b)(2) (permitting supplemental evidence to be filed in response to an evidentiary objection). In any event, the remaining exhibits are cited in Patent Owner's Response (citing Ex. 1106), Dr. Karger's Declaration (citing Ex. 1116), Petitioner's Opposition to Patent Owner's Contingent Motion to Amend (citing Ex. 1124), or Petitioner's Reply (citing Exs. 1136, 1137). Accordingly, we deny the motion as to Exhibits 1106, 1116, 1136, and 1137.

9. Conclusion

For the foregoing reasons, we deny the Motion to Exclude as to Exhibits 1105, 1106, 1116, 1119, 1120, 1125, 1136, 1137, 1144, and 1149, and we dismiss the Motion to Exclude as moot as to Exhibits 1102–1104, 1108–1115, 1117, 1118, 1121, 1123, 1126–1129, 1131–1133, 1135, 1138–1143, 1145, 1150, and 1151.

B. Petitioner's Motion to Exclude

Petitioner also filed a Motion to Exclude. Paper 77 ("Pet. Mot. Exc."). Specifically, Petitioner seeks to exclude certain paragraphs of Exhibit 2026. Pet. Mot. Exc. 5. Because we do not rely on the cited evidence in this Final Written Decision, we dismiss Petitioner's Motion to Exclude as moot.

V. CONCLUSION

For the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that claims 1–19 of the '344 patent are unpatentable as obvious over Shoubridge. Patent Owner has shown that its proposed substitute claim 21 is patentable over the prior art, but we determine that Petitioner has shown that proposed substitute claims 20 and 22 are unpatentable.

VI. ORDER

Accordingly, it is:

ORDERED that claims 1–11 and 16–19 of U.S. Patent No. 6,701,344 have been shown to be unpatentable;

FURTHER ORDERED that Patent Owner's Contingent Motion to Amend is *denied* with respect to substitute claims 20 and 22 and *granted* with respect to substitute claim 21;

FURTHER ORDERED that Petitioner's Motion to Exclude is *dismissed* as moot;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *dismissed* as moot as to Exhibits 1102–1104, 1108–1115, 1117, 1118, 1121, 1123, 1126–1129, 1131–1133, 1135, 1138–1143, 1145, 1150, and 1151, and

denied as to Exhibits 1105, 1106, 1116, 1119, 1120, 1125, 1136, 1137, 1144, and 1149; 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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