APPENDIX

APPENDIX A

NOTE: This order is nonprecedential.

UNITED STATES COURT OF APPEALS FOR THE FEDERAL
CIRCUIT
—————————————

IMPLICIT, LLC,
Appellant

v.

SONOS, INC.,
Appellee

ANDREI IANCU, Under Secretary of Commerce for
Intellectual Property and Director of the United
States Patent and Trademark Office,
Intervenor
—————————————

2020-1173, -1174
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Appeals from the United States Patent and
Trademark Office, Patent Trial and Appeal Board in
Nos. IPR201800766 and IPR2018-00767.

ON MOTION

Before PROST, *Chief Judge*, LOURIE and CHEN,
Circuit Judges.

LOURIE, *Circuit Judge*.

O R D E R

Implicit, LLC moves to vacate the decisions of the Patent Trial and Appeal Board and to remand for further proceedings in light of Arthrex, Inc. v. Smith & Nephew, Inc., 941 F.3d 1320 (Fed. Cir. 2019), cert. granted, 2020 WL 6037208 (U.S. Oct. 13, 2020). Sonos, Inc. and the Director of the United States Patent and Trademark Office separately oppose the motion. Implicit replies. Sonos moves to stay the appeals pending the Supreme Court of the United States' resolution of Arthrex. Implicit opposes the motion to stay. Sonos replies. Upon consideration thereof,

IT IS ORDERED THAT:

(1) Implicit's motion to vacate and remand is granted to the extent that the Patent Trial and Appeal Board's decisions are vacated, and the cases are remanded to the Board for proceedings consistent with this court's decision in Arthrex.

(2) Sonos' motion to stay is denied.

(3) Each side shall bear its own costs.

3a

FOR THE COURT

December 23, 2020   /s/ Peter R. Marksteiner
        Date   Peter   R.   Marksteiner
                          Clerk of Court

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APPENDIX B

UNITED STATES PATENT AND
TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND
APPEAL BOARD

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SONOS, INC.,
Petitioner,

v.

IMPLICIT, LLC,
Patent Owner.

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Case IPR2018-00766
Patent 7,391,791 B2

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Before MICHELLE N. WORMMEESTER, SHEILA
F. McSHANE, and NABEEL U. KHAN,
Administrative Patent Judges.

McSHANE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 6–9, 12, 16, 19, and 23–25 ("the challenged claims") of U.S. Patent No. 7,391,791 B2 (Ex. 1001, "the '791 patent") are unpatentable.

A. Procedural Background

Sonos Inc. ("Petitioner") filed a Petition ("Pet.") requesting *inter partes* review of claims 1–3, 6–9, 12, 16, 19, and 23–25 of the '791 patent pursuant to 35 U.S.C. §§ 311–319. Paper 1. Petitioner also filed the supporting Declaration of Roman Chertov, Ph.D. ("Chertov Declaration") to support its positions. Ex. 1009. Implicit, LLC ("Patent Owner") filed a Preliminary Response to the Petition. Paper 6. Pursuant to 35 U.S.C. § 314(a), on September 19, 2018, we instituted *inter partes* review on the

grounds of

whether claims 1–3, 6–9, 12, 16, 19, and 23–25 are

anticipated by Janevski[1] under 35 U.S.C. § 102(e);[2]

whether claims 1–3, 6–9, and 12 would have been obvious over Janevski under 35 U.S.C. § 103(a); and

whether claims 1–3, 6–9, and 12 would have been obvious over Janevski and Schneidewend[3] under 35 U.S.C. § 103(a).

See Paper 10 ("Inst. Dec." or "Dec.").

Patent Owner filed a Patent Owner Response ("PO Resp."). Paper 13. Patent Owner filed the Declaration of Dr. Atif Hashmi (Ex. 2080, "Hashmi Declaration"). Petitioner filed a Reply ("Pet. Reply") to the Patent Owner Response. Paper 22. Petitioner also filed the supporting Rebuttal Declaration of Dr. Roman Chertov ("Rebuttal Chertov Declaration"). Ex. 1022. Patent Owner filed a Sur-Reply to Petitioner's Reply ("PO SurReply"). Paper 28.

Petitioner filed a Motion to Exclude Evidence, Patent Owner filed a Response in Opposition to the Motion to Exclude, and Petitioner filed a Reply to Patent Owner's Opposition. Paper 36 ("Mot. Ex."); Paper 39 ("Mot. Ex. Opp."); Paper 40 ("Mot. Ex. Reply").

An oral hearing was held on June 17, 2019, which

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1 U.S. Patent No. 7,269,338 B2 (issued September 11, 2007) (Ex. 1007).

2 The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the '791 patent was filed before the effective date of the relevant amendments, the pre-AIA versions of §§ 102 and 103 apply.

3 U.S. Patent No. 8,286,207 B1 (issued October 9, 2012) (Ex. 1008).

was consolidated with IPR2018-00767. A transcript of the hearing is included in the record. Paper 45 ("Tr.").

B. Related Proceedings

The parties indicate that a related matter is *Implicit, LLC v. Sonos, Inc*., No. 1:17-CV-00259-LPS (D. Del.) ("the Litigation"). Pet. 2; Paper 5, 2. Patent Owner also indicates that *Implicit, LLC v. D&M Holdings U.S. Inc*., No. 1:17-CV-00258-LPS (D. Del.) is a related district court matter. Paper 5, 2.

C. The '791 Patent

The '791 patent is entitled "Method and System for Synchronization of Content Rendering" and issued on June 24, 2008 from an application filed on December 17, 2002. Ex. 1001, [22], [45], [54]. The '791 patent claims priority to U.S. Provisional Application No. 60/341,574, filed on December 17, 2001. *Id*. at [60].

The '791 patent is directed generally to synchronizing the rendering of content at multiple rendering devices. Ex. 1001, Abs., 1:50–52, Fig. 1. Rendering devices are presentation devices that present video, audio, and text displays, for instance. *Id*. at 1:19–24, 3:60–64, Fig. 1. The '791 patent explains that different rendering devices may have different time domains that make synchronized presentation difficult and a goal of the invention is to render multimedia presentation in a synchronized manner. *Id*. at 1:36–38, 1:50–52.

Each rendering device may have a "device time" and a "rendering time." Ex. 1001, 2:14–16. The "device time" is described as "the time indicated by a

designated clock (e.g., system clock) of the rendering device," and the "rendering time" is described as "the time represented by the amount of content that has been rendered by that rendering device." *Id*. at 2:16–19. The rendering time for content has a corresponding device time, "which is the device time at which the rendering occurred." *Id*. at 2:22–24. The '791 patent discloses that in order to synchronize the respective rendering devices, "the synchronization system designates one of the rendering devices as a master rendering device and designates all other rendering devices as slave rendering devices." *Id*. at 2:28–32.

The '791 patent discloses a method for calculations of the time domain differential between two devices, illustrated by Figure 2, which is reproduced below. Ex. 1001, 1:58–59.
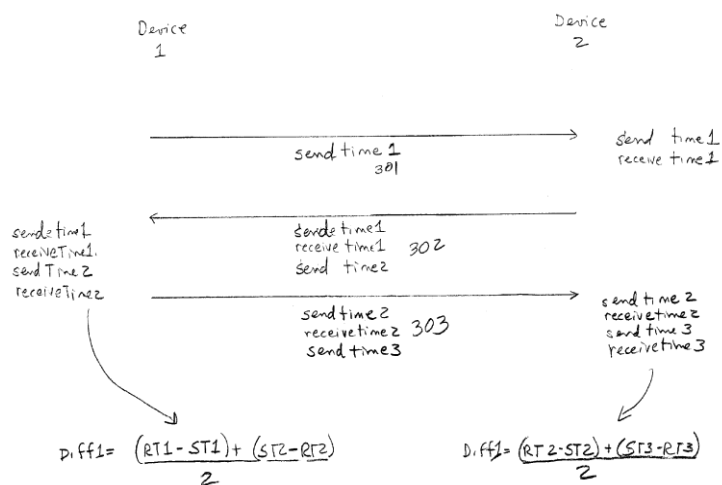
Device 1   Device 2

send time 1   301

send time 1
receive time 1

send time 1
receive time 1
send time 2
receive time 2

send time 1
receive time 1   302
send time 2

send time 2
receive time 2   303
send time 3

send time 2
receive time 2
send time 3
receive time 3

$$Diff_1 = \frac{(RT_1 - ST_1) + (ST_2 - RT_2)}{2}$$

$$Diff_1 = \frac{(RT_2 - ST_2) + (ST_3 - RT_3)}{2}$$

Fig 2

Figure 2, above, depicts the exchange of time domain messages between a master device and a slave device and calculates the average of the differences in the send and receive times of the messages to determine a time domain differential between the two devices. Ex. 1001, 4:47–5:35. Additionally, the master device sends a rendering time message to the slave device, which indicates the master device rendering time. *Id*. at 2:34–36, 7:50–59, Fig. 9.

In an embodiment of the '791 patent, the slave device converts the master device time value into the slave device time domain using the time domain differential. Ex. 1001, 3:45–48, 4:28–32. The difference between the master rendering time and the slave rendering time is determined and applied in

different manners to compensate for the differences in the rendering times in the embodiments. *Id.* at 2:39–61, 4:35–46, 7:66–8:11, Fig. 10.

Claims 1, 16, and 23 are independent claims. Claims 1 and 23 are reproduced below, with annotations added to the step limitations for reference purposes.

1. A method for synchronizing a rendering of a content provided by a source at one or more devices which are nodes of a network, the content having a rendering time, the method comprising:

[a] designating one of the one or more devices a master device, the master device having a master device time and a master rendering time*;*

[b] designating remaining devices among one of the one or more devices as at least one slave device, the at least one slave device having a slave device time and a slave rendering time;

[c] receiving the content for rendering by the master and at least one slave device;

[d] sending from the master device to the at least one slave device an indication of when the master device renders content corresponding to the master rendering time;

[e] determining a master device time domain, a slave device time domain, and a source time domain;

[f] determining whether a time domain differential exists between the master rendering time, the slave rendering time; and

[g] adjusting, based on the received indication, the rendering of the content at the at least one slave device within the slave device time domain and in

proportion to the time domain differential when present to account for variation between when the master device and the at least one slave device to render content that should be rendered at the same time.

23. A method for synchronizing rendering of content at devices which are nodes of a network, each device having a device time and a rendering time, the device time of a device being in a time domain of the device, the method comprising:

[a] designating one of the devices as a master device having a master rendering time and the one or more slave devices having a slave rendering time; and for each slave device,

[b] exchanging time domain information between the master and one or more slave devices;

[c] calculating a time domain difference between the master rendering time of the master device and the slave rendering time of the slave device based on a master device time adjusted for a difference in time domains of the slave device and the master device; and

[d] rendering content at the slave device to account for the calculated time domain difference.

Ex. 1001, 8:25–53, 10:37–52.

II. ANALYSIS

A. The Parties' Post-Institution Arguments

In our Decision on Institution, we concluded that the arguments and evidence advanced by Petitioner demonstrated a reasonable likelihood that claims 1–3, 6–9, 12, 16, 19, and 23–25 of the '791 patent would have been unpatentable under 35 U.S.C. § 102 and/or

§ 103 over the asserted prior art. Dec. 9–22. We now determine whether Petitioner has established by a preponderance of the evidence that claims 1–3, 6–9, 12, 16, 19, and 23–25 are unpatentable. We previously instructed Patent Owner "that any arguments concerning patentability not raised in the response will be deemed waived." Paper 9, 5; *see also* 37 C.F.R. § 42.23(a) ("Any material fact not specifically denied may be considered admitted."); *In re Nuvasive, Inc.*, 842 F.3d 1376, 1379–82 (Fed. Cir. 2016) (holding Patent Owner waived an argument addressed in Preliminary Response by not raising the same argument in the Patent Owner Response). Additionally, the Board's Trial Practice Guide states that the Patent Owner Response "should identify all the involved claims that are believed to be patentable and state the basis for that belief." Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

With a complete record before us, we note that we have reviewed arguments and evidence advanced by Petitioner to support its unpatentability contentions where Patent Owner chose not to address certain limitations in its Patent Owner Response. Where Patent Owner has provided argument and evidence in the Patent Owner Response, it has been considered. In this regard, the record contains persuasive arguments and evidence presented by Petitioner and based on the preponderance of the evidence before us, we conclude that the art identified by Petitioner discloses, teaches, or suggests all of the limitations of claims 1–3, 6–9, 12, 16, 19, and 23–25 of the '791 patent.

B. Claim Construction

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b).[4] Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as they would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A claim term, however, "will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002).

"device time"

Petitioner proposes that the claim term "device time" be interpreted as "the time as indicated by a designated clock (e.g., system clock) of the rendering device." Pet. 17. Petitioner asserts that this proposed interpretation is consistent with the disclosure in the '791 patent. *Id.* (citing Ex. 1001, 2:16–17).

Patent Owner proposes that claim terms "master device time," "slave device time," and "device time" of a "slave" should be construed as "time indicated by a

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4 The amendment to this rule does not apply here because the Petition was filed on March 9, 2018, which is prior to the November 13, 2018 effective amendment date. See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,343–44 (Oct. 11, 2018).

designated clock of the [master/slave] device," which was the agreed-upon construction by the parties in a related district court proceeding. PO Resp. 32 (citing Ex. 2010, 2).

In this instance, the '791 patent specification clearly sets forth a specific meaning for the term "device time," which is that proposed by Petitioner. *See* Ex. 1001, 2:16–17. Therefore, in accordance with the specification, we adopt the interpretation of "device time" as "the time as indicated by a designated clock (e.g., system clock) of the rendering device."

"rendering time"

Petitioner points to the '791 patent's disclosure stating that a device's "rendering time" is "the time represented by the amount of content that has been rendered by that rendering device." Pet. 17 (citing Ex. 1001, 2:18–19). This interpretation of the claim term has not been disputed by Patent Owner. *See* PO Resp. 13, 32–38.

We agree with Petitioner that the '791 patent specification clearly sets forth a specific meaning for the term "rendering time," which is that proposed by Petitioner. *See* Ex. 1001, 2:18–19. Therefore, in accordance with the specification, we adopt the interpretation of "rendering time" as "the time represented by the amount of content that has been rendered by that rendering device."

"time domain"

Patent Owner asserts that "time domain" should be construed as "the way a device clock tracks time," which is the interpretation that Petitioner proposed in a co-pending litigation. PO Resp. 37 (citing Ex.

2010, 2). In support, Patent Owner points to the '791 specification that indicates that an example of a time domain is that rending devices "may have system clocks that operate at slightly different frequencies" (Ex. 1001, 1:38–40), and as part of system synchronization, device times may be exchanged as indicated by a designated clock, such as a system clock (*Id.*, 4:46–5:60). PO Resp. 37.

Petitioner proposes that under the broadest reasonable interpretation that "time domain differential" as used in the claims should be interpreted to cover "any synchronization between a time measure of a master rendering device and a corresponding time measure of a slave rendering device during playback, where the time measure could either be device time or rendering time." Pet. 18. In its Reply, Petitioner argues that Patent Owner attempts to limit the interpretation of the "time domain" term to only a device clock, when the '791 patent discloses that rendering devices may have multiple time domains that include a system clock. Pet. Reply 25. Petitioner cites to the '791 patent specification, which states that "some rendering devices may have multiple time domains," with one example being "an audio rendering device may have a system clock and a clock on a digital signal processing ('DSP') interface card." *Id.* (citing Ex. 1001, 1:44–47). In response, Patent Owner asserts that even if there is a combination of clocks disclosed, that does not preclude Patent Owner's proposed construction. PO Sur-Reply 22–23.

In view of the specification's disclosures, we adopt the construction of

"time domain" as "the way a device clock tracks time." We note that the '791 patent discloses that a device may have multiple clocks and different types of clocks, such as a system clock or a clock on a digital signal processing interface card. *See* Ex. 1001, 1: 45–47.

Other Claim Terms

We determine that it is not necessary to provide an express interpretation of any other term of the claims. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Status of Janevski as Prior Art

Patent Owner asserts that Janevski does not constitute prior art to the challenged claims under § 102(e) because the subject matter of the claims was conceived and actually reduced to practice prior to Janevski's filing date of December 11, 2001. *See* PO Resp. 13–31. In response, Petitioner asserts that Patent Owner's antedating assertions are legally and substantively defective. Pet. Reply 1–22. More specifically, Petitioner argues that Patent Owner provides only uncorroborated inventor testimony on the conception of the invention and the communication of the invention for the reduction to practice, and, therefore, inurement to the benefit of the inventor has not been sufficiently demonstrated. *Id*. at 5–9. Petitioner also asserts that the evidence of the actual reduction to practice is insufficient to demonstrate the practice of every claim limitation. *Id*. at 12–22. For the reasons set forth below, we are not persuaded that Patent Owner has provided sufficient

evidence to meet its burden to demonstrate antedating the '791 patent prior to the December 11, 2001 filing date of Janevski.

1. Antedating, Generally

Petitioner bears the burden of persuasion, by a preponderance of the evidence, that the challenged claims are unpatentable. 35 U.S.C. § 316(e). Petitioner has proffered Janevski, which presumptively constitutes prior art under 35 U.S.C. § 102(e), because it was filed in the U.S. Patent and Trademark Office on December 11, 2001, which is prior to the filing date of December 17, 2002, of the '791 patent, and its priority claim to U.S. Provisional Application No. 60/341,574, filed on December 17, 2001. This difference in dates gives rise to Patent Owner's burden to produce evidence supporting a date of invention before Janevski's filing date. *See Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1576–77 (Fed. Cir. 1996).

"To antedate . . . an invention, a party must show either an earlier reduction to practice, or an earlier conception followed by a diligent reduction to practice." *Purdue Pharma L.P. v. Boehringer Ingelheim GMBH*, 237 F.3d 1359, 1365 (Fed. Cir. 2001). A party seeking to establish an actual reduction to practice must satisfy a two-prong test: (1) the party must construct an embodiment or perform a process that satisfies every element of the claim at issue, and (2) the embodiment or process must operate for its intended purpose. *See Eaton v. Evans*, 204 F.3d 1094, 1097 (Fed. Cir. 2000). The constructed embodiment must have been tested sufficiently to demonstrate that it will work for its intended purpose, but it need

not be in a commercially satisfactory stage of development. *See, e.g.*, *Scott v. Finney*, 34 F.3d 1058, 1062 (Fed. Cir. 1994); *see also Wells v. Fremont*, 177 USPQ 22, 24–25 (BPAI 1972). An actual reduction to practice can be done by another on behalf of the inventor. *De Solms v. Schoenwald*, 15 USPQ2d 1507, 1510 (BPAI 1990).

Acts by others working explicitly or implicitly at the inventor's request can inure to an inventor's benefit. *Cooper v. Goldfarb*, 154 F.3d 1321, 1332 (Fed. Cir. 1998). Inurement involves a claim by an inventor that, as a matter of law, the acts of another person should accrue to the benefit of the inventor. *Genentech, Inc. v. Chiron Corp.*, 220 F.3d 1345, 1353 (Fed. Cir. 2000). However, when a person relies on the activities of others to show actual reduction to practice, proof of conception is relevant to inurement. *See NFC Tech., LLC v. Matal*, 871 F.3d 1367, 1371–72 (Fed. Cir. 2017); *see also Sensio, Inc. v. Select Brands, Inc.*, Case IPR2013–00580, slip op. at 10–15 (PTAB Feb. 9, 2015) (Paper 31). Under *Genentech,* 220 F.3d at 1354, and *Cooper v. Goldfarb*, 240 F.3d 1378, 1383 (Fed. Cir. 2001), a Patent Owner must show that the inventor conceived the subject matter of the challenged claims and communicated that subject matter in order to inure to inventor's benefit. In *Genentech*, in the context of deciding whether the reduction to practice inured to the inventor's benefit, the Federal Circuit held that the inventor first must show that it conceived the invention. *Genentech*, 220 F.3d at 1354 ("[W]e glean at least three requirements that must be met before a non-inventor's recognition of the utility of an invention can inure to the benefit of the inventor.

First, the inventor must have conceived of the invention.").

Priority of invention and its constituent issues of conception and reduction to practice "are questions of law predicated on subsidiary factual findings." *Singh v. Brake*, 317 F.3d 1334, 1340 (Fed. Cir. 2003). Conception is "the formation, in the mind of the inventor of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice." *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985) (citing *Gunter v. Stream*, 573 F.2d 77, 80 (CCPA 1978)) (emphasis omitted). The conception analysis "necessarily turns on the inventor's ability to describe his invention with particularity. Until he can do so, he cannot prove possession of the complete mental picture of the invention." *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994). Proof of conception cannot turn on the inventor's testimony alone, but must include "corroborating evidence which shows that the inventor disclosed to others his 'completed thought expressed in such clear terms as to enable those skilled in the art' to make the invention." *Coleman*, 754 F.2d at 359. The sufficiency of corroboration is determined according to a "rule of reason." *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993) (citation omitted). This, however, does not dispense with the requirement that some independent evidence must provide corroboration. *Coleman*, 754 F.2d at 360; *see also NTP, Inc.*, 654 F.3d at 1291–92 (noting requirement of evidence corroborating inventor testimony).

2. Conception and Inurement to the Benefit of

Inventor

a. *Patent Owner's Arguments*

Patent Owner alleges that the genesis of what ultimately became the inventions of the challenged claims of the '791 patent started in connection with BeComm's Juno project, which was a project for Intel. PO Resp. 18 (citing Ex. 2001 ¶¶ 26–32). Edward Balassanian, one of the named inventors of the '791 patent, was the President and CEO of BeComm, and was named in the Juno project team. *Id.* (citing Ex. 2001 ¶ 32; Ex. 2011, 8). The other named co-inventor, Scott Bradley, was also named as a member of the Juno project. *Id.* Patent Owner argues that the Juno project recognized that true synchronization was "an unsolved computer science project, but a best effort will be made in this regard." *Id.* at 18–19 (citing Ex. 2009, 15; Ex. 2011, 37–38; Ex. 2001 ¶¶ 29–30). Patent Owner alleges that although Intel put the Juno project on hold in February 2001, BeComm continued to work on the synchronization problem. *Id.* at 19 (citing Ex. 2001 ¶ 30; Ex. 2012).

Patent Owner alleges that Messrs. Balassanian and Bradley conceived of the inventions of the '791 patent at least by December 11, 2001. PO Resp. 19 (citing Ex. 2001 ¶¶ 33, 42–47); *see also id.* at 15 (citing Ex. 2001 ¶¶ 6, 33, 42). Patent Owner contends that the inventors communicated the inventions to an internal engineering and development staff, working primarily with Guy Carpenter, an engineer, for implementation. *Id.* (citing Ex. 2001 ¶ 33).

Patent Owner asserts that BeComm source code corroborates Mr. Balassanian's testimony concerning the invention's conception and reduction to practice

prior to December 11, 2001. PO Resp. 19–20. Patent Owner also asserts that BeComm's internal documents provide additional corroboration of Mr. Balassanian's testimony. *Id*. at 20–22. Patent Owner points to a document entitled "Using Strings to Compose Applications from Reusable Components," dated October 4, 2001, as providing support. *Id*. at 21 (citing Ex. 2021; Ex. 2001 ¶¶ 61–62, 109). Patent Owner also points to a case study printed on December 3, 2001, that describes synchronization functionality. *Id*. at 22 (citing Ex. 2029, 5–7; Ex. 2077, 28–30). Finally, Patent Owner refers to a "synchronization.doc" file, which was allegedly completed on December 9, 2001, which describes functionality using beads. *Id*. (citing Ex. 2001 ¶ 75; Ex. 2037; Ex. 2077, 33; Ex. 2078). Patent Owner argues that synchronization.doc was filed as the provisional patent application on December 17, 2001, without any substantive changes, and this further evidences prior conception. *Id*. (citing Ex. 2001 ¶ 75, Ex. 2037; Ex. 2038; Ex. 2077, 33; Ex. 2078).

Patent Owner argues that the cited documentary evidence should serve as corroborating evidence because the documents were stored in a Concurrent Version System ("CVS") repository, where the documents were time stamped when added and updated in the repository. PO Sur-Reply 3. Patent Owner argues that this evidence should be considered under a rule of reason, which considers the body of evidence as a whole. *Id*. Patent Owner notes that it produced to Petitioner the source code repository for Strings, the hard drive of the BeComm demo laptop, and the website root directory from the 2000–2001

time period, and allowed copying by a forensic expert. *Id.*, 2, n.1.

b. Petitioner's Arguments

Petitioner argues that to demonstrate conception a party must show possession of every feature recited in the claims, and Mr. Balassanian's declaratory testimony fails to address the claims at issue. Pet. Reply 1–2. Petitioner contends that Patent Owner relies on an expert to make a mapping of code to the elements of the invention, but that does not demonstrate that the inventor conceived of the elements of the claims. *Id.* at 4. Petitioner argues that when a party seeks to prove conception through an inventor's testimony, the party must offer evidence in addition to that testimony. *Id.* at 5 (citing *Mahurkar*, 79 F.3d at 1577). Petitioner asserts that even if the sufficiency of corroboration is determined under a rule of reason, the evidence of corroboration must not be solely dependent on the inventor's testimony. *Id.* at 5–6 (citing *Cooper*, 154 F.3d at 1330).

Petitioner argues that Patent Owner relies on the source code written by a non-inventor, Guy Carpenter, to establish conception of the invention. Pet. Reply 9. Petitioner contends that Patent Owner presents no evidence, short of uncorroborated inventor testimony, that the inventors communicated the invention to Mr. Carpenter. *Id.* Petitioner contends that because the record is devoid of evidence that Mr. Carpenter's work inured to the benefit of the inventors, the Board should not rely on the code in assessing either conception or reduction to practice. *Id.*

c. Analysis

Because the invention of the claims of the '791 patent was allegedly reduced to practice by a non-inventor, Mr. Carpenter, Patent Owner must sufficiently demonstrate conception of the invention in order to carry its burden to antedate the Janevski reference. *Genentech*, 220 F.3d at 1354. Patent Owner does not argue otherwise—and Patent Owner provides its purported support for conception of the claimed invention in its briefing (*see* PO Resp. 18–22), and at oral hearing (*see* Tr. 35:2–5, 40:2–43:7).

We examine the evidence of record on conception under a rule of reason. Here, documentary evidence could serve to corroborate Mr. Balassanian's testimony under a rule of reason, and here that evidence is the documents that Patent Owner refers to which had been stored in an electronic CVS repository. Petitioner filed a Motion to Exclude this evidence arguing that it had not been properly authenticated under the Federal Rules of Evidence 901. However, as discussed *infra* Section III, Petitioner's Motion is denied because there is no dispute that the documents were stored in the CVS repository, with repository logs produced (Ex. 2077), and Petitioner was permitted to forensically examine the electronic evidence, which included date stamps and other metadata, which provides supplemental information in support of authentication.

Although we consider the documentary evidence that Patent Owner relies upon for corroboration of Mr. Balassanian's testimony under a rule of reason, the issue considered is whether the documents do provide factual support for Patent Owner's allegations concerning conception of the invention, which we

discuss below. If the documents do not provide that support, all that remains is Mr. Balassanian's testimony.

Regarding the conception of the invention of the claims of the '791 patent, Mr. Balassanian's testimony is limited to: Around the time of the Juno project (and after the project for Intel went on hold), I contemplated how to achieve the bestpossible synchronization of content across multiple devices as we continued our work. Mr. Bradley and I solved the synchronization problem and conceived the inventions set forth in the Claims of the Patents. We then began working on the implementation of the inventions thereafter, as detailed below. We communicated those inventions to BeComm's internal engineering and development staff to reduce them to practice. Ex. 2001 ¶ 33.

Patent Owner does not provide a specific date of conception in the time between February 2001—when Patent Owner indicates that the synchronization problem was still unsolved—and December 11, 2001. Patent Owner instead contends that the conception date was at least prior to the date of the Janevski priority date of December 11, 2011, which is also at least the date by which the invention was allegedly actually reduced to practice.[5] PO Resp. 18–19.

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[5] At the oral hearing, Patent Owner also alternatively alleged that conception occurred at least by October 28, 2001, because that is when the actual reduction to practice occurred. See Tr. 40:2–42:26 (stating that the beads were fully operational on October 23, 2001, and "there's some time stamps [on related documents] that are a few days after the 23rd of October so that's why I went with that." (id. at 42:21–22)).

On the issue of who conceived of the invention, Patent Owner relies upon Juno development documents, wherein Mr. Balassanian and Mr. Bradley were listed as "Document Contributors," in support of conception. *See* Ex. 2009, 5; Ex. 2011, 8. The Juno development documents state, however, that synchronization was an unsolved issue. *See* Ex. 2009, 15; Ex. 2011, 37–38 ("We have not yet finalized how Juno will implement the requirement that a Media Server session be able to simultaneously serve multiple concurrent Adapters and keep their playback synchronized . . . In all cases, the Adapter synchronization in these cases will be difficult at best."). Patent Owner refers to the document "Using Strings to Compose Applications from Reusable Components" (Ex. 2021), for support of conception, however, this document does not name any authors nor does it identify who contributed to its development.[6] Similarly, a case study on distributed media (Ex. 2029) fails to identify any authors or contributors. A February 2, 2001 internal email (Ex. 2012) does not suggest or indicate that Mr.

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[6] Petitioner argues that Patent Owner fails to establish conception by showing possession of every feature recited in the claim. Pet. Reply 1 (citing Coleman, 754 F.2d at 359). We note that Patent Owner argues that under the "Strings" document's disclosures the BeComm technology provided the "best possible synchronization" and used a clock synchronization modules encapsulated in a bead placed in the data flow as late as possible for each rendering device. PO Resp. 20–21 (citing Ex. 2021, 9; Ex. 2001 ¶¶ 61–62, 109; Ex. 2077, 18). The disclosure in this document is directed to the placement of general clock synchronization functionality in a data stream, but does not disclose or suggest the invention of the claims of '791 patent, which is how clock synchronization is actually performed.

Balassanian continued to work on the synchronization problem identified in the Juno project after the project was terminated in midFebruary 2001, and there is no other documentary support on that issue.

The document entitled "synchronization.doc" (Ex. 2037), which served as the disclosure for the provisional application, does not name any authors or contributors, however, in the metadata for this document the author is listed as "guyc," which appears to identify Guy Carpenter, who wrote the source code. *See* Ex. 2077, 33. This identification is confirmed in a December 15, 2001 email written by Mr. Bradley, who stated that this document was written by Mr. Carpenter. Ex. 2038. In that email, which copied Mr. Balassanian, Mr. Bradley indicated that the document as written was "sufficient for the patent provisional as is," and his additional comments did not appear to be needed for submittal. *See id.* This documentary evidence does not provide support that Messrs. Balassanian and Bradley conceived of the invention of the challenged claims of the '791 patent, and is dated after the December 11, 2001 priority date of Janevski.

We have reviewed other evidence in the record, including a technical presentation (Ex. 2002) and a case study (Ex. 2029), and find no indication or suggestions that corroborate conception. The documents do not identify Messrs. Balassanian and Bradley nor do they provide disclosures that evince possession of invention of the claims of the '791 patent.

There is no documentary evidence in the record,

besides the limited testimony in Mr. Balassanian's declaration reproduced above, that supports that there was recognition of the conception of the invention, or that there was any communication of the invention from Messrs. Balassanian and Bradley to BeComm's internal engineering and development staff, or more specifically, to Mr. Carpenter. Patent Owner does not address the issue of communication of the invention in order to inure to inventor's benefit in its briefing. *See* PO Sur-Reply 2–7. There are no arguments or evidence presented by Patent Owner that anyone else was involved in development of the source code besides Mr. Carpenter. *See* PO Resp. 18–31; PO Sur-Reply 2–19.

In sum, there is no evidence provided by Patent Owner as to who conceived of the invention, when the conception occurred, whether there was a recognition of conception of the invention embodied in the claims of the '791 patent, whether the inventors communicated the invention to Mr. Carpenter, or whether Mr. Carpenter was working at the inventors' request to reduce the invention to practice—with the exception of the limited testimony of Mr. Balassanian. It is Patent Owner's burden to produce evidence supporting conception before Janevski's filing date, and that evidence is required in addition to the testimony of an alleged inventor. *See Mahurkar*, 79 F.3d at 1577 (Fed. Cir. 1996). Even if we were to consider the statements in Mr. Balassanian's declaration, we would still find them insufficient to carry Patent Owner's burden of production to establish conception of the invention and the communication of the invention to Mr. Carpenter

such that any actual reduction to practice could inure to the inventors' benefit. *Cooper*, 240 F.3d at 1383 (Fed. Cir. 2001).

At the oral hearing, Patent Owner argued that Mr. Carpenter, a source code developer, worked for BeComm, and Mr. Balassanian was a principal of that company, so common sense dictated that inurement should be found. Tr. 56:22–57:10. We recognize that to establish inurement, another person may be working "implicitly at the inventor's request." *Cooper*, 154 F.3d at 1332. However, we decline to find that the generalized relationship of the individuals within an organization is sufficient to make a requisite showing, especially in view of the scarcity of other evidence of conception in the record.

In view of the failure of Patent Owner to carry its burden to demonstrate conception of the invention, we need not address issues relating to reduction to practice of the invention.

Accordingly, because we do not find that antedating applies, Janevski constitutes prior art to the challenged claims of the '791 patent under § 102(e).

D. Level of Ordinary Skill in the Art

Petitioner proposes that one of ordinary skill in the art would possess "the equivalent of a four-year degree from an accredited institution in computer science, computer engineering, electrical engineering, or the equivalent, and approximately 2–4 years of professional experience in the fields of networked systems and networked-based applications, or an equivalent level of skill and knowledge." Pet. 70, n.5.

Dr. Chertov provides supporting testimony for the proposed qualifications. Ex. 1009 ¶ 45. Patent Owner does not propose any assessment of the level of ordinary skill in the art or object to Petitioner's propose qualifications. *See generally* PO Resp. 1–41. Patent Owner's expert, Dr. Hashmi, declined to offer an opinion on the qualifications of one of ordinary skill in the art. Ex. 2080 ¶ 16.

On this record, we adopt Petitioner's proposed assessment. In addition, we note that the art of record in this proceeding—namely, Janevski and Schneidewend—is indicative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Further, neither Dr. Chertov nor Dr. Hashmi testifies that adoption of a different definition would change the outcome of this case.

E. Alleged Anticipation of Claims 1–3, 6–9, 12, 16, 19, and 23–25 by Janevski

Petitioner contends that claims 1–3, 6–9, 12, 16, 19, and 23–25 are anticipated by Janevski. Pet. 38–69. To support its contentions, Petitioner provides explanations as to how Janevski discloses each claim limitation. *Id.* Petitioner also relies upon the Chertov Declaration (Ex. 1009) and the Rebuttal Chertov Declaration (Ex. 1022) to support its positions.

We begin our discussion with a brief summary of Janevski, and then address the evidence and arguments presented.

1. Janevski (Ex. 1007)

Janevski is directed to synchronizing playback of digital streams based on rendering personal video recorder ("PVR") devices. Ex. 1007, 1:8–20, Fig. 1.

During playback, one PVR may be designated as the initiator PVR and the other is designated as the participant PVR. *Id.* at 6:16–22.

PVRs can account for misalignment of times by synchronization. *See id.* at 8:39–47. Time synchronization can be implemented in different ways, and one method includes the exchange of synchronization messages as depicted in Figure 4, reproduced below. *Id.* at 8:53–10:23, 11:52–12:4, 13:21–22.
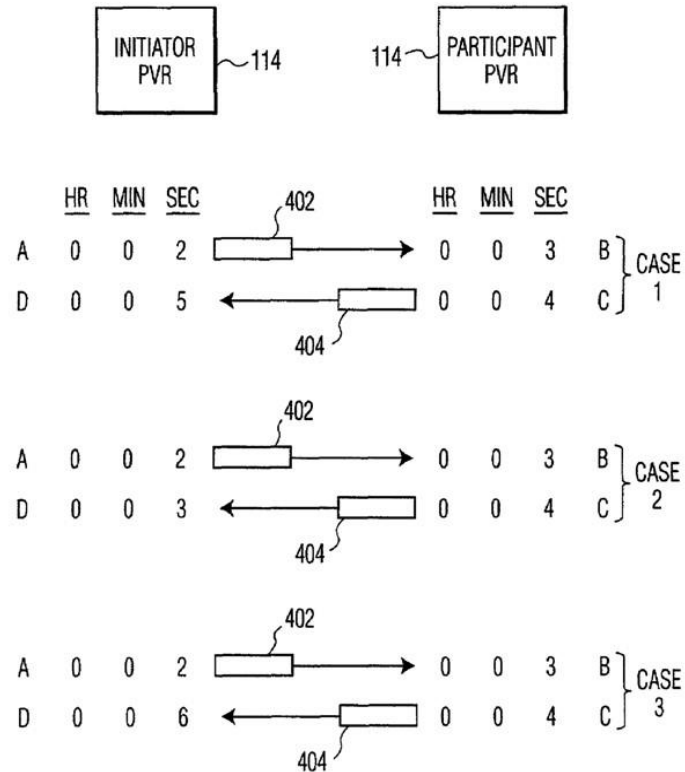

Figure 4, above, depicts different "cases" that represent scenarios wherein the respective PVRs

exchange synchronization messages (402 and 404), which allows time misregistrations to be calculated. *See* Ex. 1007, 8:65– 10:20. Messaging exchanges include time stamps. *See id.* at 10:4–12, 11:52–55.

The initiator PVR sends a status message to the participant PVR that may include calculated time misregistrations, "the time into the program," and identifying information for a "query frame," which is a frame that had just been played by the initiator PVR. *See* Ex. 1007, 7:36–50, 10:19–35, 12:5–36. The identifying information includes a query signature and query time stamp. *Id.* at 10:19–35, 12:5–36. Janevski discloses that time misregistrations between the initiator and participant PVRs are compensated for in synchronization. *Id.* at 12:59– 13:21.

After time synchronization, frame synchronization for fine tuning is done in a second phase. Ex. 1007, 10:52–62. The query frame and its identifying information are used to determine if there are differentials between the frames rendered by the initiator and participant PVRs, respectively, that include differences in video time, and are referred to as differential "frame misregistration." *Id.* at 10:36– 60, 13:24–14:63. Frame misregistration between the devices is compensated for by adjusting the speed/direction of the video rendering. *Id.* at 10:60– 62, 13:24–30, 14:35–63.

2. Analysis

A claim is unpatentable under 35 U.S.C. § 102 if a prior art reference discloses each and every limitation of the claimed invention, either explicitly or inherently. *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d

1043, 1047 (Fed. Cir. 1995); *see MEHL/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) ("To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention . . . ;" any limitation not explicitly taught must be inherently taught and would be so understood by a person experienced in the field); *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (the dispositive question is "whether one skilled in the art would reasonably understand or infer" that a reference teaches or discloses all of the limitations of the claimed invention).

a. Independent Claim 1

i. Petitioner's Assertions

Petitioner asserts that Janevski discloses every limitation of claim 1. Pet. 55–64. Beginning with the preamble, Petitioner contends, and we agree, that Janevski discloses a method of synchronizing a rendering of a content from a source at a device, which is a node of a network.[7] *Id.* at 56. Petitioner asserts, and we agree, that the rendering devices, such as PVRs, are nodes of a network, and are interconnected by an Internet network. *Id.* (citing Ex. 1007, 1:13–17, 3:13–16, 6:6–10). Janevski discloses the broadcast of a television program from a network that is communicated by various means, including the Internet, to PVRs, for viewers. *Id.*

For limitation 1[a], which recites "designating one of the one or more devices a master device, the master device having a master device time and a master

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7 For purposes of this Decision, we assume, without deciding, that the preamble of claim 1 is limiting.

rendering time," Petitioner contends, and we agree, that the "initiator" PVR of Janevski amounts to the "master device" of the claim. Pet. 56 (citing Ex. 1007, 6:4–25 ("Initially, the 'initiator' is the PVR that starts the session . . . [a]ll other PVRs participating in the session are 'participants.'")). Petitioner asserts, and we agree, that the PVR has a "time count" provided by its video timer, which equates to the "master device time." *Id*. (citing Ex. 1007, 7:51–62, 8:39–10:3 (disclosing the "respective timings of the video timers"), Figs. 2, 4; Ex. 1009 ¶ 157). Petitioner further asserts, and we agree, that Janevski discloses that the PVR keeps track of the amount of time that a video program has been rendered by "the time or frame into the program," which amounts to the claimed "master rendering time." *Id*. at 56–57 (Ex. 1007, 1:65–2:5, 7:41–50; Ex. 1009 ¶ 157).

For limitation 1[b], which recites designating a slave device, having a slave device time and a slave rendering time, Petitioner asserts, and we agree, that a "participant" PVR amounts to a slave device. Pet. 57. Similar to limitation 1[a], Petitioner contends, and we agree, that the participant PVR has a time count provided by the video timer, which is the "slave device time," as well as keeping track of the amount of a video program that has been rendered in terms of "the time or frame into the program." *Id*. at 57–58.

For limitation 1[c], Petitioner asserts, and we agree, that the claimed "receiving content" is disclosed by Janevski's disclosure of "synchronized PVR viewing system" in which the respective initiator and participant PVRs receive broadcasts of video content. Pet. 58–59 (citing Ex. 1007, 1:13–17, 3:13–

16 ("As the broadcasts 112a, b enter House 1 and House 2, respectively, they are received by receivers 113a, b."), 6:5–39, Fig. 1).

For limitation 1[d], which recites "sending from the master device to . . . slave device an indication of when the master device renders content corresponding to the master rendering time," Petitioner contends, and we agree, that Janevski discloses sending the query time stamp for "a frame that the initiator has just played or has recently played," which "represent[s] where the [initiator PVR's] playback is in the content at a particular time which is current." Pet. 59–60 (citing Ex. 1007, 10:19–35, 12:5–36; Ex. 1009 ¶ 163).

For limitation 1[e], which recites "determining a master device time domain, a slave device time domain, and a source time domain," Petitioner asserts, and we agree, that Janevski discloses that the determination of the time misregistration between initiator and participant PVRs discloses their respective time domains relative to each other. Pet. 61 (citing Ex. 1007, 8:53–10:20, 11:52–12:4; Ex. 1009 ¶ 166). Petitioner further asserts, and we agree, that Janevski's disclosed capability to find and record a television program necessarily shows that the PVR has an indication of the time domain of the service provider, thus disclosing the "source time domain." *Id.* at 62 (citing Ex. 1007, 1:13–24 ("PVRs may be programmed to automatically find and record a user's favorite television program or programs . . . .")). Dr. Chertov provides additional support, testifying that a person of ordinary skill in the art "would understand that having an indication of the times-of-day when a

service provider will be broadcasting television programming is a necessary requirement for a PVR— it would not be possible for a PVR to automatically find and record the correct television program without this information." Ex. 1009 ¶ 167. We find that Janevski inherently discloses the determination of a source time domain in view of Janevski's disclosure of the capability to record television programs and Dr. Chertov's testimony that one of skill would know that this functionality requires determination of the time domain of the source service provider.

For limitation 1[f], which recites "determining whether a time domain differential exists between the master rendering time, the slave rendering time," Petitioner asserts, and we agree, that each participant PVR in Janevski synchronizes its time count with the initiator PVR's time count and then uses this adjusted "time count" during rendering. Pet. 62 (citing Ex. 1007, 12:59–13:21). With this, Petitioner argues, and we agree, that a time differential is calculated between the amount of content that has already been rendered by a master device and that rendered by the slave device. *Id.*

Limitation 1[g] recites the step of "adjusting, based on the received indication, the rendering of the content at the . . . slave device within the slave device time domain and in proportion to the time domain differential when present to account for variation between when the master device and the . . . slave device to render content that should be rendered at the same time." Petitioner contends, and we agree, that "rendering of the content" of the slave device "in proportion" to the "time domain differential" is

disclosed in Janevski by its synchronized time count of the participant PVR with the initiator PVR time count, and the adjusted time count used during rendering. Pet. 63–64 (citing Ex. 1007, 12:59–13:21; Ex. 1009 ¶¶ 170–173). Petitioner further asserts, and we agree, that Janevski discloses that "after each 'participant' PVR calculates its 'video time' differential with the 'initiator' PVR, the 'participant' PVR compensates for the 'video time' differential by adjusting its rendering of video content." *Id.* at 64 (citing Ex. 1007, Abs., 3:52–57, 10:60–62, 13:24–30, 14:35–63; Ex. 1009 ¶ 173). In sum, we agree with Petitioner that Janevski discloses every limitation of the preamble and steps of claim 1 and credit Dr. Chertov's supporting testimony (Ex. 1009 ¶¶ 153–173), as it is consistent with the prior art disclosures.

ii. Patent Owner's Arguments

Patent Owner argues that Janevski fails to disclose limitations associated with two claim terms: "device time" and "time domain." We do not find these arguments persuasive for the reasons discussed below.

(a) Device Time

Patent Owner alleges that Janevski fails to disclose a "device time" because its disclosed video timer is not linked to any clock of the PVR or a device within the DVR. PO Resp. 33. Patent Owner argues that the video timer is a timer only and not a clock. *Id.* Patent Owner contends that the purpose of the device clock is to synchronize the operations on a device, and Janevski's video timer only discloses the playout time of the content. *Id.* Patent Owner refers to Janevski's disclosure of the timer advancing or

rolling back to move the location of video for playback. *Id*. at 33–34 (citing Ex. 1007, 2:29–32). Patent Owner additionally asserts that Janevski recognizes that its synchronization method does not use a device clock, and instead is "based on the differences in the playout time within the video to synchronize multiple PVRs." *Id*. at 34 (citing Ex. 1007, 8:53–56, 8:63– 10:3). Patent Owner further alleges that Janevski describes both "timers" and "clocks" and uses them differently; with that, Patent Owner alleges that timers are linked to the time in a video to current playback, but not to broadcast of clock times to synchronize devices. PO Sur-Reply 21–22 (citing Ex. 1007, 8:48–52).

In sum, Patent Owner argues that Janevski's video timer: (i) is not linked to any clock of the PVR or a device within the PVR; (ii) is not a clock; and (iii) is only disclosed as the playout time for content. These arguments are based on attempts to add limitations to the claim term and overlook Janevski's disclosures. Janevski is directed, in significant part, to timer synchronization of the "respective timers of the video timers" of the PVRs. *See* Ex. 1007, 8:65– 10:20, Fig. 4. Claim 1 recites that the respective master and slave devices have "a device time," which is construed as "the time as indicated by a designated clock (e.g., system clock) of the rendering device." *See supra* Section II.B. We agree with Petitioner's assertion that a "device time" does not have to be a time indicated by either a "system clock" or a "device clock" under that interpretation; rather, the device time can be rendered by any designated clock, with a

"system clock" serving as only one example.[8] *See* Pet. Reply 23. Moreover, we agree with Petitioner that, under the claim interpretation adopted, "device time" does not have to perform a specific function, short of reflecting the device time. *See id.*

Janevski discloses its "message flow design" is to "determine the misalignment, if any, in the respective timings of the video timers 212 of two PVRs." Ex. 1007, 8:39–41. As part of synchronization, messaging of times (shown in hours ("H"), minutes ("M"), and seconds ("S") in Figure 4), according to video timers 212 of the respective PVRs, is exchanged. *See e.g.*, Ex. 1007, 9:15–29, Fig. 4 (reproduced *supra* p. 24). Although the video timer may also provide the time for how long the PVR has been playing the video, it also provides a device time under this disclosure of Janevski. Dr. Chertov provides testimony, unrebutted by Dr. Hashmi, that the PVR video timer of Janevski amounts to a clock of the PVR, and the "time count" rendered by the video timer is device time (Ex. 1009 ¶¶ 102, 157, 159). This testimony is supported by the transmissions of times represented in hours, minutes, and seconds as described and shown in Janevski's Figure 4. We agree with Petitioner that Janevski uses "clock" and "timer" synonymously in descriptions of time synchronization implementations, rather than drawing distinctions in

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8 Even if we were to adopt Patent Owner's proposed claim construction of "device time" as "time indicated by a designated clock of the [master/slave] device" (supra Section II.B), the same Patent Owner argument would be at issue, that is, whether Janevski discloses "device time" as it is rendered by any designated clock.

the use of the terms, as Patent Owner argues. *See* Pet. Reply 24 (citing Ex. 1007, 8:39–64[9]); *see also* PO Sur-Reply 21–22 (citing Ex. 1007, 8:48–52). Additionally, under the claim construction adopted here for "device time," which is not limited to a specific type of clock (short of it being "designated"), and under the ordinary meaning of a "clock" as "a device for measuring and indicating time" (Ex. 1023, 3), we find that Dr. Chertov's testimony regarding Janevski's disclosure of "device time" is consistent with the term's interpretation.

Patent Owner also asserts that Petitioner has not shown that the "query time stamp" constitutes a device time. PO Resp. 35. Patent Owner argues that "Janevski does not indicate if the query time stamp contains a time indicated by a designated clock of any particular device, such as the initiator device." *Id*. Patent Owner contends that the query time stamp references the current location of the query frame in the video. *Id*. Patent Owner asserts that in Janevski, the query frame and its time stamp represent "where the playback is in the content at a particular time which is current," and the destination PVR compares that time stamp with the time stamps for other frames to determine the right frame to select for playback, so there is no disclosure of a device time within the query time stamp. *Id.* at 36 (citing Ex. 1007, 12:10–11, 14:1–14).

On this issue as well, Patent Owner attempts to

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9 Petitioner cites to Exhibit 1001 in its Reply; however, the Reply's discussion is directed to the video timers in Janevski (Ex. 1007). Pet. Reply 24. Thus, it appears that the Reply's citation should have been to Janevski.

read in additional limitations into the claim. Here, for limitation 1[d], Petitioner refers to Janevski's initiator PVR sending a status message with a query time stamp for "a frame that the initiator has just played or has recently played." *See* Pet. 59–60 (citing Ex. 1007, 10:19–35, 12:5–36). Dr. Chertov testifies that the transmission of the query time stamp represents the functionality of sending an indication of when the rendering occurs corresponding to the master rendering time. Ex. 1009 ¶ 163. The evidence supports that the query time stamp is part of a message that is generated to perform time synchronization and the time in the query time stamp is similarly set to other time stamps as shown in Figure 4 of Janevski (Ex. 1007, 10:4–22, Figs. 4, Fig. 5), which as discussed above represents a device time, and additionally supports that the query time stamp represents when rendering occurs corresponding to the master rendering time. And, there is no requirement that the rendering time has to be measured by a certain kind of clock.

We find the evidence provided by Petitioner demonstrates that

Janevski discloses "device time" as claimed.

(b) Time Domain

Patent Owner argues that the recited "time domain" is tied into a device time, and for reasons similar to the "device time" limitations discussed above, Patent Owner asserts Petitioner has failed to show that Janevski discloses the "time domain" limitations of the challenged claims. PO Resp. 37. Patent Owner asserts that "time domain" refers to the way a device clock tracks time, and is therefore linked

to the "clock of a device." *Id.* Patent Owner argues that "[t]he video timer does not indicate a device time, but how long the PVR has been playing the video for. The query timestamp likewise does not indicate the initiator's device time; it is only affiliated with a particular frame in the video." *Id.* at 38.

Here, Patent Owner's arguments are directed to alleged deficiencies in Janevski's disclosures related to the "device time" limitations, which we addressed above, and found unpersuasive. We note also that the "master time domain" and "slave time domain" of limitation 1[e] are addressed by Petitioner by reliance on Janevski's determination of the time misregistration between initiator and participant PVRs, which is asserted to disclose the respective time domains relative to each other. Pet. 61 (citing Ex. 1007, 8:53–10:20, 11:52–12:4; Ex. 1009 ¶ 166). We have addressed the manner of the determination of the time misregistration above, and find Janevski's disclosures evince the respective time domains.

iii. Summary

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 1 of the '791 patent is anticipated by Janevski.

b. Independent Claim 23

Petitioner asserts that Janevski discloses every limitation of claim 23. Pet. 38–46. Petitioner asserts, and we agree, that Janevski discloses the preamble's method for synchronizing the rendering of content at devices, which are nodes of a network, which have a device time and a rendering time, where the device

time is in its time domain.[10] *Id.* at 38. Petitioner references Janevski's disclosure of rendering devices, i.e., PVRs, which are mapped as nodes, which are interconnected by an Internet network. *Id.* (citing Ex. 1007, 1:8–11, 6:4–39, 6:45–51, Abs., Fig. 1). Petitioner asserts, and we agree, that the PVR has a "time count," provided by the PVR "video timer," which is the claimed "device time" that is in a "time domain" of the PVR. *Id.* (citing Ex. 1007, 7:51–62, 8:39–10:3, Figs. 2, 4). Petitioner also contends, and we agree, that Janevski discloses that each PVR discloses tracking the amount of content that has been rendered in terms of "the time or frame into the program," which is the claimed rendering time. *Id.* (citing Ex. 1007, 1:65–2:5, 7:41–50; Ex. 1006, 147).

Limitation 23[a] is the step of designating a master device that has a master rendering time and a slave device having a slave rendering time, where Petitioner identifies the PVR that initiates a "synchronized PVR viewing system" as the initiator or master device. Pet. 40 (citing Ex. 1007, Abs., 6:4–25, 7:36–39, 8:39–10:3, Fig. 1). Other PVRs participating are the "participant" PVRs, which are mapped as the slave devices. *See id.* Petitioner asserts, and we agree, that Janevski discloses that each PVR keeps track of the amount of content of a video program that has been rendered in terms of "the time or frame into the program," which is the claimed rendering time. *Id.* (citing Ex. 1007, 1:65–2:5, 7:41–50; Ex. 1009 ¶ 105).

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10 For purposes of this Decision, we assume, without deciding, that the preamble of claim 23 is limiting.

Limitation 23[b] is the step of exchanging time domain information between the master and slave devices. Petitioner asserts, and we agree, that Janevski discloses a message flow for exchanging "synchronization messages" between the master and slave PVRs that include information regarding the respective "time counts." Pet. 41 (citing Ex. 1007, 8:39–10:3, Fig. 4). Petitioner asserts, and we agree, that Janevski also includes the exchange of time domain information by broadcasts of respective clock values periodically to maintain synchronization or with relays of synchronization messages. *Id*. at 41–42 (citing Ex. 1007, 8:53–64; Ex. 1009 ¶ 109).

Limitation 23[c] recites "calculating a time domain difference between the master rendering time of the master device and the slave rendering time of the slave device based on a master device time adjusted for a difference in time domains of the slave device and the master device," which Petitioner asserts, and we agree, is disclosed in Janevski. Pet. 42–45 (citing Ex. 1009 ¶¶ 110–116). Petitioner relies upon Janevski's disclosure that each "participant" PVR periodically determines whether there is any misalignment between the "initiator" PVR's rendering and the "participant" PVR's rendering using a two-phase process that involves a determination of two separate time differentials between the PVRs. *Id*. at 42 (citing Ex. 1007, Abs., 7:36–50, 10:36–60, 12:59–13:29, 15:32–33). In the first phase, PVRs perform a time synchronization exchange to determine a differential in time counts. *Id*. at 43 (citing Ex. 1007, Abs., 8:39–10:3, 11:43–12:4). Then, in the second phase, a status message on time

misregistration is sent between the PVRs that includes a query signature and query time stamp. *Id.* at 43 (citing Ex. 1007, Abs., 7:36–50, 10:19–35, 12:5–36). The time misregistration is compensated for by adjusting the "time count" (Ex. 1007, 12:59–13:21), and the participant PVR uses its adjusted time count along with the other information included in the status message to calculate a differential between the video frames that have been rendered by the PVRs, which may be represented in terms of video time. *Id.* (citing Ex. 1007, 10:36–60, 13:24–14:63).

For limitation 23[d], which recites "rendering content at the slave device to account for the calculated time domain difference," Petitioner asserts, and we agree, that Janevski discloses this limitation by the functionality that synchronizes the time counts of the PVRs and then uses the adjusted time count during rendering. Pet. 45 (citing Ex. 1007, 12:59– 13:21). Petitioner also refers to Janevski's disclosure of calculating a video time differential between PVRs and adjusting the rendering of video content. *Id.* (citing Ex. 1007, Abs., 3:52–57, 10:60–62, 13:24–30, 14:35–63).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond the alleged deficiencies in Janevski's disclosures of the recited "device time" and "time domain," which we addressed above in our analysis of claim 1. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 23 of the '791 patent is anticipated by Janevski.

c. Independent Claim 16

Independent claim 16 contains claim limitations that are similar to those in claim 1. *Compare* Ex. 1001, 8:25–53, *with* Ex. 1001, 9:45–10:6. We agree with Petitioner that Janevski discloses the limitations of claim 16 for the reasons discussed above for claim 1. *See* Pet. 47–54.

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond the alleged deficiencies in Janevski's disclosures of the recited "device time" and "time domain," which we addressed above in our analysis of claim 1. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 16 of the '791 patent is anticipated by Janevski.

d. Claims 2 and 3

Claim 2 depends from claim 1, and includes the additional limitation that "the indication sent from the master device to the at least one slave device includes the master device time at which the master device renders content corresponding to the master rendering time." Ex. 1001, 8:54–57. Claim 3 depends from claim 2 and includes the additional limitation that "the indication sent from the master device to the at least one slave device includes the master rendering time." *Id.* at 8:58–60. Petitioner asserts, and we agree, that Janevski discloses the limitations of claims 2 and 3 by its disclosure of the "initiator" PVR (the recited "master device") sending each "participator" PVR (the recited "slave devices") a status message that includes a query time stamp for "a frame that the initiator has just played or has recently played," which "represent[s] where the

[initiator PVR's] playback is in the content at a particular time which is current." *See* Pet. 49– 50, 65 (citing Ex. 1007, 10:19–35, 12:5–6; Ex. 1009 ¶¶ 133–34, 175–176).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of the claim limitations of dependent claims 2 and 3, beyond those arising from alleged deficiencies in Janevski's disclosures of the limitations of claim 1, which we addressed above. *See* PO Resp. 32–38. For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 2 and 3 of the '791 patent are anticipated by Janevski.

e. Claim 6

Claim 6 depends from claim 1 and includes the additional limitation "wherein the determining the time domains of the master device, the slave device, and the source includes determining the time domains relative to another device by sending the send and receive times of at least one of the master device, the slave device, and the source to the other device." Ex. 1001, 8:65–9:3. Petitioner asserts, and we agree, that Janevski discloses this claim limitation in its description of the time synchronization message flow by, at least, the disclosure of a participant PVR sending the "initiator" PVR a "reply synchronization message 404" that includes both a receive time (referred to as "time B") and a send time of the "participant" PVR (referred to as "time C"). *See* Pet. 65–66. Petitioner also relies upon Janevski's disclosure of messaging, as depicted in Figures 4 and 5. *Id*.

Patent Owner presents no additional arguments

on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the limitations of claim 1, which we addressed above. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 6 of the '791 patent is anticipated by Janevski.

f. Claim 7

Claim 7 further depends from claim 6 and includes additional limitations directed to calculating a "first difference" and "second difference" between receive and send times and associated summing. Ex. 1001, 9:4–12. Petitioner asserts, and we agree, that Janevski discloses these claim limitations by its disclosures associated with time misregistration between the initiator and participant PVRs' time count. *See* Pet. 66–67.

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the limitations of claim 1, which we addressed above. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 7 of the '791 patent is anticipated by Janevski.

g. Claim 8

Claim 8 further depends from claim 7 and includes the additional limitation directed to "conforming the slave rendering time to the master

device rendering time so that the master device time and the at least one slave device operate in the same time domain; and deducting or adding the time domain differential to the same time domain." Ex. 1001, 9:13–20. Petitioner asserts, and we agree, that Janevski discloses these claim limitations by the disclosure of participant PVRs periodically time synchronizing time counts with the initiator PVR time count to account for the calculated time misregistration, which acts to deduct or add the time count differential. Pet. 68 (citing Ex. 1007, 12:59– 13:21; Ex. 1009 ¶ 184).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the limitations of claim 1, which we addressed above. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 8 of the '791 patent is anticipated by Janevski.

h. Claim 9

Claim 9 depends from claim 1 and includes the additional limitation that "the sending of the indication from the master device to the slave devices occurs at various times so that the at least one slave device can adjust the rendering of the content as appropriate." Ex. 1001, 9:21–24. Petitioner asserts, and we agree, that Janevski discloses that the status message containing the query time stamp is periodically sent by the initiator PVR to ensure that the respective PVRs remain synchronous. Pet. 68–69 (citing Ex. 1007, 7:36–38, 15:32–33; Ex. 1009 ¶ 185).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the limitations of claim 1, which we addressed above. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claim 9 of the '791 patent is anticipated by Janevski.

i. Claims 12 and 19

Claim 12 depends from claim 1 and includes the additional limitation wherein "the content is sent from different sources to the master device and the slave devices." Ex. 1001, 9:31–33. Claim 19 depends from claim 16 and recites a similar limitation. *Id.* at 10:24–26. Petitioner asserts, and we agree, that Janevski discloses this claim limitation by its disclosure that the initiator and participant PVRs each receive respective broadcasts of video content that may be sent by "different cable or satellite providers." Pet. 54– 55, 69 (citing Ex. 1007, 3:13–16, 6:5–39; Ex. 1009 ¶ 51). Petitioner also relies on Janevski's disclosure that the video content may be sent by other types of sources such as Internet sources, DVD players, and/or VHS players. *Id.* at 55 (citing Ex. 1007, 1:13–17, 16:6–16).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the "device time" and "time domain" limitations recited in independent claims 1 and 16, which we addressed above in our analysis of claim 1. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 12 and 19 of the '791 patent are anticipated by Janevski.

j. Claims 24 and 25

Claim 24 depends from claim 23 and additionally recites "including sending a master device time and the master rendering time to each slave device for use in calculating the time domain difference," and claim 25 depends from claim 24 and includes the limitation "wherein the master device sends the master device time and the master rendering time to the slave devices." Ex. 1001, 10:53–58. Petitioner asserts, and we agree, that Janevski discloses that the initiator PVR sends the participator PVRs a status message that includes information used for synchronizing the PVRs' renderings, which includes an indication of the time into the video program and a query time stamp for a recently played video frame. Pet 46 (citing Ex. 1007, Abs., 7:36–50, 10:19–35, 12:5–36; Ex. 1009 ¶ 120).

Patent Owner presents no additional arguments on the merits of the prior art disclosures of these claim limitations, beyond those arising from alleged deficiencies in Janevski's disclosures of the "device time" and "time domain" limitations recited in independent claim 23, which we addressed above in our analysis of claim 1. *See* PO Resp. 32–38.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 24 and 25 of the '791 patent are anticipated by Janevski.

B. Alleged Obviousness of Claims 1–3, 6–9, and 12 Over Janevski and Schneidewend, or Over Janevski Alone

1. Obviousness, Generally

patent 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 the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To be relevant, evidence of nonobviousness must be commensurate in scope with the claimed invention. *In re Huai–Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Thus, to be accorded substantial weight, there must be 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). "For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention." *Kao*, 639 F.3d at 1068. The stronger the showing of nexus to the claimed invention, the greater the weight accorded the objective indicia of nonobviousness. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776

F.2d 281, 306 (Fed. Cir. 1985). We apply "a [rebuttable] presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product 'is the invention disclosed and claimed in the patent.'" *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016).

2. Analysis

Petitioner contends that Janevski inherently discloses the claim element of "determining . . . a source time domain" as recited in claims 1–3, 6–9, and 12 in its anticipation challenges; however, to the extent that there is disagreement, Petitioner also relies upon obviousness under Janevski or the combination of Janevski and Schneidewend to demonstrate obviousness of these claims in the alternative. Pet. 29, 69–70.

To support its contentions, Petitioner provides explanations as to how Janevski and Schneidewend are directed to, particularly, "determining . . . a source time domain" of claim 1. Pet. 69–72. Petitioner refers to Schneidewend, which is directed to receiving and rendering video content from multiple sources, as is Janevski, and its disclosures relating to a "digital video receiving system" ("DVRS") configured to receive and render video content broadcasts from multiple sources, and the use of the Program and System Information Protocol for Terrestrial Broadcast and Cable standard ("PSIP") with the broadcast of ancillary information, including "system timing information providing a time clock reference enabling determination of a time at which a specific program is to be broadcast," for the teaching of the

limitation. *Id*. at 70 (quoting Ex. 1008, 1:19–55, 2:37–44; citing Ex. 1008, 3:1–36). Dr. Chertov testifies that a person of ordinary skill in the art would have had reason to combine the teachings of Schneidewend with Janevski in order to comply with the PSIP standards and that such a combination would have benefits, including avoidance of time clock inaccuracies. *Id*. at 72 (citing Ex. 1008, 5:11–36; Ex. 1009 ¶¶ 198–199).

We agree with Petitioner that Schneidewend teaches the source time domain limitation of the claims and Petitioner has demonstrated articulated reasoning with rational underpinnings to support the combination of Schneidewend and Janevski. *See KSR*, 550 U.S. at 417 (2007) ("if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.")

Patent Owner presents no arguments on the merits of the prior art disclosures or teachings of "source time domain," which therefore stand unrebutted, nor does Patent Owner present arguments related to the rationale to combine Janevski and Schneidewend. PO Resp. 13–41.

Patent Owner argues, however, that the claims would not have been obvious in view of objective evidence. PO Resp. 38. Patent Owner asserts that there was unmet need for a solution to synchronize across multiple devices the playback of audio and video received from a source. *Id*. (citing Ex. 2001 ¶¶ 26–30; Ex. 2009, 15; Ex. 2012, 37–38). Patent Owner

refers to the Juno project with Intel that recognized that synchronization of audio playback was an unsolved problem at the time (late 2000 to early 2001) and that synchronization would be difficult, at best, to achieve. *Id*. at 39 (citing Ex. 2001 ¶¶ 29–30; Ex. 2009, 14–15; Ex. 2011, 37–38). Patent Owner argues that, at that time, Intel had not solved this problem. *Id*.

Petitioner argues, and we agree, that the evidence of long-felt unmet need provided by Patent Owner is insufficient. Pet. Reply 26. Rather than identifying a long-term industry-wide need, the evidence provided is limited to Patent Owner's own evidence, predominantly focused on the Intel project, with no industry-wide evidence provided. Ex. 2001 ¶¶ 26–30; Ex. 2009, 15. Moreover, Patent Owner's identification of the timeframe at issue is limited to the short-term period of late 2000 to 2001. *Id*. This is insufficient to demonstrate that there was an industry-recognized long-felt need for the invention. *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1377 (Fed. Cir. 2000).

Patent Owner also contends that Intel's willingness to pay significant value for the Juno project provides supporting evidence that the solution was not obvious at the time. PO Resp. 39. Patent Owner argues that the licensing of technology from the patents flowing from BeComm's innovations, of which the instant patent is a part, are evidence of nonobviousness. *Id*. at 40 (citing Ex. 2001 ¶ 10). It is additionally argued that the success of Petitioner (Sonos) is unlikely to have been achieved if it were built on technology that had been obvious since 2001. *Id*. at 40–41.

We do not find persuasive Patent Owner's arguments of commercial success based on Petitioner's products, licensing of patents, or a willingness to pay for technology development because they are not supported by sufficient evidence, and most notably, there is insufficient evidence provided demonstrating a nexus with the claims of the '791 patent. "Evidence of [objective indicia] is only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia].'" *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006)).

Here, there is no evidence provided by Patent Owner to show that Petitioner's products are covered by the claims of the '791 patent. *See* PO Resp. 40–41. Nor does Patent Owner provide evidence that the licenses granted to other companies were for products that are covered by the claims of the '791 patent. *Id.* at 40; Ex. 2001 ¶ 10; *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004) (noting that licenses "may constitute evidence of nonobviousness; however, only little weight can be attributed to such evidence if the patentee does not demonstrate a nexus between the merits of the invention and the licenses of record" (quoting *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995)). Finally, Patent Owner does not provide an explanation of the nexus of the Intel Juno project with the '791 patent claims, and Patent Owner's allegation that the invention of the patent was conceived after the Juno project had been terminated cuts against a possible nexus. *See* PO Resp. 19, 39–40. Thus, we cannot significantly credit

the objective evidence alleged in view of the deficiencies of supporting evidence.

Turning to the claim limitations, as discussed above, for the "source time domain" limitation of claim 1 (*supra* pp. 27–28), we determined that the Petition provides evidence that demonstrates that Janevski's capability to find and record a television program necessarily shows that the PVR has an indication of the time domain of the service provider, thus, disclosing the "source time domain." Also, based on the Petition's showing that Janevski discloses the other limitations of claim 1 (*supra* pp. 25–34), we determined that Petitioner has shown that Janevski anticipates the claim. Further, as discussed above, in view of the deficiencies of the supporting evidence, we do not significantly credit the objective evidence of record. Inasmuch as "anticipation is the epitome of obviousness" (*In re McDaniel*, 293 F.3d 1379, 1385 (Fed. Cir. 2002)), we find that claims 1–3, 6–9, and 12 are rendered obvious by Janevski.

In addition, we agree with Petitioner's showing, discussed above, that the combination of Janevski and Schneidewend teaches every limitation of claims 1–3, 6–9, and 12, as it is consistent with the prior art disclosures and crediting Dr. Chertov's supporting testimony for the rationale to combine Schneidewend and Janevski (Ex. 1009 ¶¶ 189–201). And, as discussed above, in view of the deficiencies of the supporting evidence, we do not significantly credit the objective evidence of record. We, therefore, determine that the Petition provides sufficient evidence supporting the obviousness of claims 1–3, 6–9, and 12 over the combination of Janevski and Schneidewend.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 1–3, 6–9, and 12 of the '791 patent are unpatentable as obvious over Janevski alone and obvious over the combination of Janevski and Schneidewend.

III. MOTION TO EXCLUDE

Petitioner moves to exclude Patent Owner's Exhibits 2002–2009, 2011–2078, and 2083–2088 due to alleged lack of sufficient authentication and Exhibits 2081 and 2082 as improperly incorporated by reference. Mot. Ex. 1–7.

Petitioner argues that Exhibits 2002–2009, 2011–2078, and 2083– 2088 lack sufficient authentication because Patent Owner relies on the testimony of Mr. Balassanian, one of the inventors, for authentication of these exhibits. Mot. Ex. 2. Petitioner asserts that although the testimony of a witness with personal knowledge of an exhibit would normally be sufficient to authenticate, that is not the situation here because Patent Owner relies on these exhibits to prove the invention predates the prior art, so independent evidence of authentication is required besides inventor testimony. *Id*. at 3.

Federal Rule of Evidence 901 requires that a proponent need only "produce evidence sufficient to support a finding that the item is what the proponent claims it is" to meet its burden on authentication. Fed. R. Evid. 901(a). Authenticity is, therefore, not an especially high hurdle for a party to overcome. *See United States v. Patterson*, 277 F.3d 709, 713 (4th Cir. 2002). We disagree with Petitioner that the only evidence concerning authenticity of these Exhibits that should be considered is Mr. Balassanian's

testimony. *See* Mot. Ex. 3. Mr. Balassanian testifies that the majority of documents produced were from records that included metadata records (Ex. 2001 ¶¶ 91–166), and there is no dispute that the documents were stored electronically. *See* Mot. Ex. Opp. 2. There is also no dispute that Patent Owner provided the BeComm demo laptop hard drive and a CD backup of its CVS repository as well as documents in native format to Petitioner's forensic expert. *See id.* at 2–3. Petitioner presents no contentions that the electronic data associated with the exhibits at issue is suspect. Mot. Ex. Reply 1–5. The only exhibit for which a metadata record is not presented is an email (Ex. 2038), which Patent Owner argues is dated on its face and discusses another exhibit (Exhibit 2037), which has an associated metadata record. Mot. Ex. Opp. 9.

Here, document logs were produced (Ex. 2077), albeit from files held by Mr. Balassanian, but Petitioner was permitted to forensically examine the electronic evidence, which includes date stamps and other metadata. Under these circumstances, our view is that the document logs provide additional support for the authenticity of the exhibits, which we find to be sufficient. Accordingly, we *deny* Petitioner's Motion to Exclude Exhibits 2002–2009, 2011–2078, and 2083–2088.

Exhibits 2081 and 2082 are claim charts that allegedly explain Dr. Hashmi's source code trace. We have not relied on these exhibits in rendering this Decision. Therefore, we *dismiss as moot* the Motion to Exclude these Exhibits.

IV. CONCLUSION

For the foregoing reasons, we determine that

Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–3, 6–9, 12, 16, 19, and 23–25 are anticipated by Janevski; that claims 1–3, 6–9, and 12 would have been obvious in view of Janevski; and that claims 1–3, 6–9, and 12 would have been obvious in view of Janevski and Schneidewend.

V. ORDER

Accordingly, it is

ORDERED that Petitioner has demonstrated by a preponderance of the evidence that any one of claims 1–3, 6–9, 12, 16, 19, and 23–25 of U.S. Patent No. 7,391,791 B2 is unpatentable;

FURTHER ORDERED that the Motion to Exclude Exhibits 2002–2009, 2011–2078, and 2083–2088 is *denied*;

FURTHER ORDERED that the Motion to Exclude Exhibits 2081 and 2082 is dismissed as moot; 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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APPENDIX C

UNITED STATES PATENT AND
TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND
APPEAL BOARD

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SONOS, INC.,
Petitioner,

v.

IMPLICIT, LLC,
Patent Owner.

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Case IPR2018-00767
Patent 8,942,252 B2

Before MICHELLE N. WORMMEESTER, SHEILA F.
McSHANE, and NABEEL U. KHAN, *Administrative
Patent Judges.*

KHAN, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Determining All Challenged Claims Unpatentable

35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

Sonos, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") to institute an inter partes review of claims 1–3, 8, 11, and 17 (the "challenged claims") of U.S. Patent No. 8,942,252 B2 (Ex. 1001, "the '252 Patent"). Implicit, LLC ("Patent Owner") timely filed a Preliminary Response. Paper 6 ("Prelim. Resp."). On September 19, 2018, upon consideration of the Petition, the Preliminary Response, and the evidence cited by the parties, we determined that Petitioner established a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition and instituted review to determine the patentability of the challenged claims on all grounds. Paper 8 ("Dec. Inst."), 1.

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 9, "PO Resp."). Petitioner filed a Reply (Paper 17, "Pet. Reply") thereto, and Patent Owner filed a Sur-Reply (Paper 22, "PO SurReply"). Petitioner supports its challenge with the Declaration and Rebuttal Declaration of Roman Chertov, Ph.D. (Exs. 1009, 1022). Patent Owner supports its Response with the Declarations of Edward Balassanian (Ex. 2001), and Atif Hashmi, Ph.D. (Ex. 2080).

Further, Petitioner filed a Motion to Exclude. Paper 30. Patent Owner filed a Response to Petitioner's Motion to Exclude (Paper 33) and Petitioner filed a Reply in support of its Motion to

Exclude (Paper 34). We address these papers below.

An oral hearing was held on June 17, 2019, and the hearing transcript is included in the record. Paper 39 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, addresses issues and evidence raised during the inter partes review. For the reasons that follow, Petitioner demonstrates by a preponderance of the evidence that claims 1–3, 8, 11, and 17 of the '252 Patent are unpatentable.

B. Related Proceedings

The parties inform us that the '252 Patent is asserted in *Implicit, LLC v. Sonos, Inc.*, No. 1:17-cv-00259-LPS (D. Del.). Pet 2; Paper 5, 2.

Additionally, Patent Owner identifies *Implicit, LLC v. D&M Holdings U.S. Inc.*, No. 1:17-cv-00258-LPS (D. Del) as a related matter. Paper 5, 2.

C. The '252 Patent

The '252 Patent is generally directed to "rendering of content at multiple rendering devices in a synchronized manner." Ex. 1001, 1:18–19.

The '252 Patent explains that a multimedia presentation may include different types of content, such as video, audio, and text, that are rendered on different devices (e.g., a video display and a stereo system). Id. at 1:23–25. However, their rendering often needs to occur in a synchronized manner because the video, audio, and text content may correspond with each other. Id. at 1:25–31. Rendering content on different devices in a synchronized manner may be difficult, however,

because the devices may each have different time domains or system clocks that operate at slightly different frequencies. Id. at 1:40–44. This can lead video and audio content to gradually appear to be out of synchronization with each other. Id. at 1:44– 46.

The '252 Patent provides a method and system for "synchronizing the rendering of content at various rendering devices." Id. at 2:17–18. In this method, "each device has a device time and a rendering time." Id. at 2:18– 20. "The device time is the time as indicated by a designated clock (e.g., system clock) of the rendering device. The rendering time is the time represented by the amount of content that has been rendered by that rendering device." Id. at 2:20–23. For example, if a rendering device is displaying 30 frames a second, then after 450 frames have been rendered, the rendering time will be 15 seconds. The corresponding device time may be 30 minutes and 15 seconds, if the device was initialized 30 minutes before rendering began. Id. at 2:23–32. "The synchronization system designates one of the rendering devices as a master rendering device and designates all other rendering devices as slave rendering devices. Each slave rendering device adjusts the rendering of its content to keep it in synchronization with the master rendering device." Id. at 2:33–38. The master rendering device sends messages with its device and rendering time to the slave devices, which determine whether they are synchronized with the master device and determine the differential if they are not synchronized. Id. at 2:38–43. This determination can be made in a variety of ways that involve comparisons between the

rendering times of the master and slave and the device times of the master and slave. Id. at 2:46–65. The time differentials between master device time and slave device time can be smoothed using various techniques such as averaging the last few time differentials using a decaying function to limit the impact of the oldest time differential. Id. at 7:16–26. Once the device and rendering time differentials are known, the slave rendering devices may adjust their rendering of content as appropriate to compensate for the difference. Id. at 4:24–40.

D. Illustrative Claim

Of the challenged claims, claims 1 and 11 are independent claims. Claims 2, 3, and 8 depend from claim 1 and claim 17 depends from claim 11.

Claim 1, reproduced below, is illustrative:

1. A method comprising:

a master rendering device rendering a first content

stream; and

sending, from the master rendering device to a first one

of a plurality of slave devices, a plurality of master rendering times indicative of statuses of the rendering the first content stream at the master rendering device at different times;

wherein the first slave device is configured to smooth a

rendering time differential that exists between the master rendering device and the first slave device in order to render a second content stream at the first

slave device synchronously with the rendering of the first content stream at the master rendering device, wherein smoothing the rendering time differential includes calculations using the plurality of master rendering times.

E. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–3, 8, 11, and 17 of the '252 Patent on the following grounds:

Ground	Basis	Challenged Claims	Reference(s)
1	§ 103(a)	1–3, 8, 11, and 17	Janevski[1]
2	§ 103(a)	1–3, 8, 11, and 17	Janevski and Azevedo[2]
3	§ 103(a)	1–3, 8, 11, and 17	Janevski and Mills[3]
4	§ 103(a)	1–3, 8, 11, and 17	Janevski and Berthaud[4]
5	§ 103(a)	1–3, 8, 11,	Janevski and

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[1] Janevski, U.S. Patent No. 7,269,338, issued Sept. 11, 2007 (Ex. 1007, "Janevski").

[2] Azevedo, Fault-Tolerant Clock Synchronization for Distributed Systems with High Message Delay Variation, IEEE Workshop on Fault-Tolerance Par. and Dist. Syst., (1994) (Ex. 1010, "Azevedo").

[3] Mills, Network Time Protocol (Version 3) Specification, Implementation and Analysis, Network Working Group, University of Delaware (March 1992) (Ex. 1011, "Mills").

[4] Jean-Marc Berthaud, Time Synchronization Over Networks Using Convex Closures, IEEE/ACM Transactions on Networking (Apr. 2000) (Ex. 1012, "Berthaud").

		and 17	Eidson[5]
6	§ 103(a)	1–3, 8, 11, and 17	Janevski and Baumgartner[6]

II. DISCUSSION

A. Level of Ordinary Skill

Petitioner proposes that a person of ordinary skill in the art "would have the equivalent of a four-year degree from an accredited institution in computer science, computer engineering, electrical engineering, or the equivalent, and approximately 2-4 years of professional experience in the fields of networked systems and networked-based applications, or an equivalent level of skill and knowledge." Pet. 24 n.2. Patent Owner does not provide an alternative proposal for the level of ordinary skill and Dr. Hashmi does not offer an opinion on a proposed level of ordinary skill. See Ex. 2080 ¶ 16. For purposes of this Decision, we adopt Petitioner's proposed level of ordinary skill as it is consistent with the prior art of record and the relevant field, and also reflects the necessary level and type of education and practical experience for one of ordinary skill in the art.

B. Claim Interpretation

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2017); *Cuozzo Speed Techs., LLC*

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[5] Eidson, U.S. Patent No. 6,278,710, issued Aug. 21, 2001 (Ex. 1013, "Eidson").

[6] Baumgartner, U.S

v. Lee, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).[7] Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))), *cert. denied*, 138 S. Ct. 1695 (Apr. 30, 2018).

Petitioner proposes constructions for the following terms: "device time," "rendering time," sending/receiving "a plurality of master rendering times," "smooth a rendering time differential," "determining a smoothed rendering time differential," and "window." Pet. 18–23. Patent Owner explicitly disputes the construction of "device time" in its Response, but does not otherwise raise any specific, substantive objections to Petitioner's other proposed

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[7] A recent amendment to this rule does not apply here because the Petition was filed on March 9, 2018, which is prior to the November 13, 2018 change in the standard. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

constructions. See PO Resp. 13–14, 38–39. We determine that other than "device time," an explicit construction of the claim terms for which Petitioner proposes constructions is not necessary for purposes of this Decision.

1. *"device time"*

Petitioner proposes the term "device time" should be construed as "a time indicated by any clock of a given rendering device." Pet. 18. Patent Owner argues "device time" should be construed as a "time indicated by a designated clock of the [master/slave] device." PO Resp. 39. Patent Owner argues this construction "is sourced directly from the specification," which, according to Patent Owner, states that "[t]he device time is the time as indicated by a designated clock (e.g., system clock) of the rendering device." Id. Petitioner argues that, under the broadest reasonable interpretation standard, there is no difference in scope between the two proposed constructions because, even under Patent Owner's construction, there is no limitation on what kind of clock can be "a designated clock." Pet. Reply 26.

"In claim construction, [the Federal Circuit] gives primacy to the language of the claims, followed by the specification." *Tempo Lighting Inc. v. Tivoli LLC*, 742 F.3d 973, 977 (Fed. Cir. 2014) (citing *In re Morris*, 127 F.3d 1048, 1056 (Fed. Cir. 1997)). The '252 Patent makes clear "[t]he device time is the time as indicated by a designated clock (e.g., system clock) of the rendering device." Ex. 1001, 2:20–21. This statement from the '252 Patent, which we take to be a clear definition of the term, is cited by both parties in

support of their respective constructions. Thus, we adopt it as our construction of the term and construe "device time" as "the time as indicated by a designated clock (e.g., system clock) of the rendering device."

C. Antedating Janevski

Petitioner argues claims 1–3, 8, 11, and 17 would have been obvious over Janevski and over Janevski combined with the other cited references. Pet. 24–26. Patent Owner argues Janevski is not prior art to the '252 Patent. PO Resp. 14. For the reasons set forth below, we are not persuaded that the inventor's testimony is corroborated adequately, and we determine that Patent Owner has not met its burden of producing sufficient evidence to antedate Janevski.

1. Patent Owner's Contentions

The Janevski reference was filed on December 11, 2001 and does not claim an earlier effective filing date. Ex. 1007, at [22]. The provisional patent application from which the '252 Patent claims priority was filed six days later on December 17, 2001. Ex. 1001, at [60]; Pet. 7. Patent Owner alleges that "[p]rior to December 11, 2001, . . . the inventors conceived of the inventions of the Challenged Claims, and those inventions were reduced to practice in time to remove Janevski as a prior art reference." PO Resp. 14. In support of this contention, Patent Owner provides a declaration of Mr. Edward Balassanian, one of the two named inventors of the '252 Patent (Ex. 2001), certain internal documents from BeComm (the predecessor of Patent Owner, Implicit, LLC), and the declaration of Patent Owner's expert, Dr. Hashmi (Ex. 2080). Patent Owner alleges that the internal BeComm documents and Dr. Hashmi's expert

declaration corroborate Mr. Balassanian's testimony that he and Mr. Bradley (the other named inventor) conceived of the inventions prior to December 11, 2001, and timely reduced them to practice. PO Resp. 15.

a. Conception

In its Response, Patent Owner describes the "Juno" project as the genesis of what later became the invention of the '252 Patent. PO Resp. 19 (citing Ex. 2001 ¶¶ 26–32). According to Patent Owner, the Juno project began in late 2000 and Mr. Balassanian was involved as the President and CEO of BeComm. PO Resp. 19 (citing Ex. 2001 ¶ 32; Ex. 2011 at 8). Early Juno documents show that as of December 2000, BeComm believed "true synchronization [was] an unsolved computer science problem" (Ex. 2009 at 15) and that as of February of 2001, BeComm had "not yet finalized how Juno will implement the requirement that a Media Server session be able to simultaneously serve multiple concurrent Adapters and keep their playback synchronized" (Ex. 2011 at 37).

Relying on Mr. Balassanian's declaration, Patent Owner alleges that "in the ensuing months [after the Juno project ended] Mr. Balassanian and Mr. Bradley conceived of the inventions" (PO Resp. 19–20 (citing Ex. 2001 ¶¶ 33, 42–74)), and communicated the invention to BeComm's internal engineering and development staff (id. at 20 (citing Ex. 2001 ¶ 33)). Patent Owner alleges that Mr. Balassanian and Mr. Bradley worked with BeComm's Engineering Master, Mr. Guy Carpenter, to implement the inventions. Id.

To corroborate Mr. Balassanian's testimony that

Mr. Balassanian and Mr. Bradley conceived of the invention, Patent Owner relies on BeComm source code files and certain internal BeComm documents. PO Resp. 20– 23. Patent Owner contends the source code files were initially checked in on September 10, 2001, and fully operational by the end of October 2001, as indicated by BeComm's Concurrent Version System ("CVS") repository check-in dates. PO Resp. 20–21 (citing Ex. 2001 ¶¶ 37–38; Ex. 2013 at 2; Ex. 2080 ¶¶ 39–49).

In addition to the source code, Patent Owner highlights four internal BeComm documents to corroborate Mr. Balassanian's testimony that he and Mr. Bradley conceived of the invention prior to December 11, 2001: (1) "Using Strings to Compose Applications from Reusable Components" dated October 2001, which describes a system using clock synchronization modules to "achieve the best possible synchronization" (PO Resp. 21 (citing Ex. 2021 at 8)); (2) certain documentation describing the Strings Audio Player demonstrations, which Patent Owner alleges incorporated the functionality of the source code (PO Resp. 22 (citing Ex. 2001 ¶¶ 64–69, 113–116; Exs. 2025–28, 2034)); (3) a case study that describes certain synchronization functionality that Patent Owner alleges was printed on December 3, 2001 (PO Resp. 23 (citing Ex. 2029 at 5–7; Ex. 2077 at 28– 30)); and (4) "synchronization.doc," which Patent Owner contends was completed on December 9, 2002, and which was eventually filed on December 17, 2001, as the provisional patent application to which the '252 Patent claims priority (PO Resp. 23 (citing Exs. 2037, 2077)).

b. Reduction to Practice

To corroborate Mr. Balassanian's testimony that the inventions were reduced to practice before December 11, 2001, Patent Owner relies primarily on two types of evidence. First, Patent Owner points to specific demonstrations, known internally as the "Fight Club demonstrations," of the synchronization functionality that Mr. Balassanian witnessed and participated in prior to December 11, 2001. PO Resp. 24–25 (citing Ex. 2001 ¶¶ 53–60). These demonstrations involved a video file, "fightclubrgb.avi," that Patent Owner contends has a date-modified timestamp of September 7, 2001. PO Resp. 24 (citing Ex. 2077 at 21). According to his testimony, Mr. Balassanian recalls the Fight Club demonstration operated by having a master device split the video and audio of the fightclubrgb.avi video file, play and render the video, and send the video and audio to separate slave devices where the video and audio were synchronized with the master device. PO Resp. 24–25 (citing Ex. 2001 ¶¶ 43, 58, 59).

Second, Patent Owner relies on source code packages dated October and November of 2001. PO Resp. 25 (citing Ex. 2031 at 2; Ex. 2032 at 2; Ex. 2034 at 2). Dr. Hashmi opines that the source code would practice the challenged claims when run and would operate in the way Mr. Balassanian recalls, i.e. by splitting video and audio and synchronizing between master and slave devices. PO Resp. 25–26 (citing Ex. 2082). The source code files that Dr. Hashmi analyzed are dated November 1 and 15 of 2001. Ex. 2080 ¶¶ 62–104.

Based on the dates of the Fight Club

demonstration files and the source code files, and the fact that Dr. Hashmi testifies that the source code practices the limitations of the challenged claims, Patent Owner contends that the inventions were reduced to practice before Janevski's December 11, 2001 priority date. PO Resp. 19–28.

2. Petitioner's Arguments

Petitioner presents several arguments against Patent Owner's attempt to swear behind Janevski's priority date, including (1) that Mr.

Balassanian's testimony has not addressed the actual claim limitations (Pet. Reply 1–4); (2) that Mr. Balassanian's testimony is not independently corroborated (Pet. Reply 5–8); (3) that Patent Owner relies on source code written by non-inventor Mr. Carpenter to establish conception and reduction to practice of the invention without evidence that such reduction to practice inures to the benefit of the named inventors; and (4) that the source code upon which Patent Owner relies fails to practice each and every claim limitation. Pet. Reply 9.

Petitioner argues Mr. Balassanian's testimony regarding conception should be given no weight because Mr. Balassanian failed at this deposition to provide his understanding of the meaning of the claim limitations. Without providing such testimony, Petitioner argues, Mr. Balassanian cannot competently testify regarding any conception of the claimed inventions. Pet. Reply 2–3 (citing Ex. 1019, 20:16–22:24, 26:5–16, 36:3–19, 39:18–41:12, 44:22–45:3, 47:6–49:20, 50:11–22, 51:22–52:4, 53:1–24, 165:9–166:10).

Petitioner further argues that Mr. Balassanian's testimony is not independently corroborated because the documents cited in the declaration can only provide corroboration with the help of Mr. Balassanian's testimony, leading to a circular problem that the Federal Circuit criticized in *Apator Miitors ApS v. Kamstrup A/S*, 887 F.3d 1293 (Fed. Cir. 2018), a case Petitioner argues is particularly relevant to the facts at hand here. Pet. Reply 6–8. For example, Petitioner argues that documents related to the Fight Club demonstrations "are silent about any demonstrations actually being conducted prior to Janevski" and that only through Mr. Balassanian's testimony are the documents linked to any alleged demonstrations. Pet. Reply 8. Petitioner argues that the documents alone do not evidence that any demonstrations actually took place, when they allegedly took place, who was present, and what the results of the demonstrations were. Pet. Reply 8.

Petitioner argues that Patent Owner relies on source code written by a non-inventor, Mr. Guy Carpenter, to establish conception of the invention but that no evidence, other than Mr. Balassanian's testimony, is presented showing that the inventors communicated the invention to Mr. Carpenter. Pet. Reply 9 (citing Exs. 2019, 2017, 2020 (each of which lists Mr. Carpenter as the owner)). Thus, Petitioner argues, the record is devoid of evidence that Mr. Carpenter's work inured to the benefit of the inventors. Pet. Reply 9.

Finally, Petitioner argues that Patent Owner's source code fails to practice every limitation of the claim and thus cannot be relied upon to show

conception and reduction to practice of the invention. Pet. Reply 12. Specifically, Petitioner argues the source code fails to meet the "render time" limitation because the portions of the source code that Patent Owner relies upon for teaching this limitation actually refer to the system time of the master device rather than the rendering time. Pet. Reply 13. Petitioner also argues the source code does not synchronize between master and slave and that the documentation shows that the system's goal was to synchronize between two slaves instead. Pet. Reply 15–20.

3. Analysis

"In an *inter partes* review, the burden of persuasion is on the petitioner to prove 'unpatentability by a preponderance of the evidence,' 35 U.S.C. § 316(e), and that burden never shifts to the patentee." *Dynamic Drinkware, LLC v. National Geographics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The burden of production, however, is a shifting burden. Id. at 1379. Thus, Petitioner bears the burden of persuasion, by a preponderance of the evidence, that the challenged claims are unpatentable. 35 U.S.C. § 316(e). Petitioner has proffered Janevski, which presumptively constitutes prior art under 35 U.S.C. § 102(e), because it was filed on December 11, 2001, which is prior to the December 17, 2001 date of U.S. Provisional Application No. 60/341,574, to which the '252 Patent claims priority. This difference in dates shifts the burden of production to Patent Owner to produce evidence supporting a date of invention before Janevski's filing date. See Dynamic Drinkware, 800 F.3d at 1379.

"To antedate . . . an invention, a party must show either an earlier reduction to practice, or an earlier conception followed by a diligent reduction to practice." *Purdue Pharma L.P. v. Boehringer Ingelheim GmbH*, 237 F.3d 1359, 1365 (Fed. Cir. 2001). "Conception is the formation, in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice." *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). Conception is complete when the idea is so clearly defined in the inventor's mind that only ordinary skill is necessary to reduce the invention to practice. *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994). Actual reduction to practice occurs when: (1) a party constructs an embodiment or performs a process that satisfies every element of the claim at issue, and (2) the embodiment or process operates for its intended purpose. *See Eaton v. Evans*, 204 F.3d 1094, 1097 (Fed. Cir. 2000).

Acts by others working explicitly or implicitly at the inventor's request can inure to an inventor's benefit. *Cooper*, 154 F.3d at 1332. Inurement involves a claim by an inventor that, as a matter of law, the acts of another person should accrue to the benefit of the inventor. *Genentech, Inc. v. Chiron Corp.*, 220 F.3d 1345, 1353 (Fed. Cir. 2000). However, when a person relies on the activities of others to show actual reduction to practice, proof of conception is relevant to inurement. *See Sensio, Inc. v. Select Brands, Inc.*, IPR2013-00580, Paper 31 at 10–15 (PTAB Feb. 9, 2015) (Final Written Decision); *see also NFC Tech., LLC v. Matal*, 871 F.3d 1367, 1371–72

(Fed. Cir. 2017). In Genentech, in the context of deciding whether the reduction to practice inured to the inventor's benefit, the Federal Circuit held that the inventor first must show that she conceived the invention. Genentech, 220 F.3d at 1354 ("[W]e glean at least three requirements that must be met before a non-inventor's recognition of the utility of an invention can inure to the benefit of the inventor. First, the inventor must have conceived of the invention."). This requirement makes sense; otherwise, a person could antedate a prior art reference without showing that she was the first to reduce the invention to practice and also without showing that she was the first to conceive the invention, contrary to the requirements for antedating an invention. *See Purdue Pharma*, 237 F.3d at 1365. Thus, Patent Owner must show that the inventor conceived the subject matter of the invention in order to have someone else's reduction to practice inure to the inventor's benefit. Genentech, 220 F.2d at 1354.

It is well established that when a party seeks to prove conception through an inventor's testimony, the party must proffer independent evidence corroborating the inventor's testimony. *Cooper*, 154 F.3d at 1330. To be "independent," the corroborating evidence must be evidence other than the inventor's testimony. *In re NTP, Inc.*, 654 F.3d 1279, 1291 (Fed. Cir. 2011). The sufficiency of the proffered corroboration is determined by a "rule of reason" analysis in which all pertinent evidence is examined. *In re NTP*, 654 F.3d at 1291. Even under the "rule of reason" analysis, however, the "evidence of

corroboration must not depend solely on the inventor himself." *Cooper*, 154 F.3d at 1321; *see also Hahn v. Wong*, 892 F.2d 1028, 1033 (Fed. Cir. 1989) (corroborating evidence must be "independent of information received from the inventor").

Petitioner argues that because Mr. Guy Carpenter, a non-inventor, authored the source code relied upon to show conception and reduction to practice, Patent Owner must show that Mr. Carpenter's actions inure to the benefit of the inventors. Pet. Reply 9. In order to do so, Patent Owner must show that the inventors conceived of the invention.

Mr. Balassanian testifies that:

> Around the time of the Juno project (and after the project for Intel went on hold), I contemplated how to achieve the bestpossible synchronization of content across multiple devices as we continued our work. Mr. Bradley and I solved the synchronization problem and conceived the inventions set forth in the Claims of the Patents. We then began working on the implementation of the inventions thereafter, as detailed below. We communicated those inventions to BeComm's internal engineering and development staff to reduce them to practice. We worked primarily with Guy Carpenter, an Engineering Master at BeComm, to implement the inventions, as I describe below.

Ex. 2001 ¶ 33. Thus, Mr. Balassanian testifies that (1) he and Mr. Bradley conceived of the invention, (2)

he and Mr. Bradley then communicated the inventions to BeComm's staff, including to Mr. Carpenter, and (3) he and Mr. Bradley worked with BeComm's staff, including Mr. Carpenter, to reduce the inventions to practice. If properly corroborated, this testimony would show that Mr. Carpenter's work in reducing the invention to practice inures to the benefit of Mr. Balassanian and Mr. Bradley. However, as we explain below, Patent Owner has not carried its burden of production to present sufficient evidence to independently corroborate Mr. Balassanian's testimony that he and Mr. Bradley conceived of the invention and communicated it to BeComm's staff.

Initially, we note Patent Owner does not provide a specific date on which Mr. Balassanian or Mr. Bradley conceived of the invention. Instead, Patent Owner presents evidence spanning a time period of roughly a year as support for the argument that conception occurred before the December 11, 2001 priority date of Janevski. This evidence includes internal BeComm documents, evidence of audio and video demonstrations that allegedly show the synchronization technology, and BeComm source code modules that Patent Owner contends practice the claim limitations. PO Resp. 19–29. However, as discussed below, none of this evidence supports the contention that it was Mr. Balassanian and/or Mr. Bradley who conceived of the invention and subsequently communicated the invention to Mr. Carpenter.

We start with evidence related to the Juno project, which Patent Owner argues was the "genesis

of what ultimately became the synchronization technology." PO Resp. 19. We note that the two primary documents related to the Juno project relied upon by Patent Owner show the invention had not yet been conceived during the December 2000 to February 2001 time frame when the project was active. For example, the "Juno Phase 0 Document," which lists Mr. Balassanian, Mr. Bradley, and Mr. Carpenter as "Document Contributors" (Ex. 2009 at 5), states that "[b]oth Jupiter [codename for Intel] and BeComm recognize that true synchronization is an unsolved computer science problem, but a best effort will be made in this regard" (Ex. 2009 at 15). The "Juno: Phase 1" document also lists Mr. Balassanian, Mr. Bradley, and Mr. Carpenter as "Document Contributors" (Ex. 2011 at 8), and states "[w]e have not yet finalized how Juno will implement the requirement that a Media Server session be able to simultaneously serve multiple concurrent Adapters and keep their playback synchronized." Ex. 2011 at 37. These documents make clear that a "permanent idea of the complete and operative invention" had not yet been formulated during this time period. See Cooper, 154 F.3d at 1327.

The next document relied upon is titled "Using Strings to Compose Applications from Reusable Components." This document, dated October 4, 2001, does not list either of the two inventors as authors and only names "BeComm Corporation" as the source of the document. Ex. 2021 at 1. Mr. Balassanian's testimony also does not indicate who the authors of the document are, referring to it only as "BeComm documentation." See Ex. 2001 ¶ 61. Moreover, the

document discusses synchronization only briefly and details corresponding to the claim limitations are missing from the document.

Documents related to the Strings Audio Player (Exs. 2025–28) also do not list either of the two inventors as authors, and neither Patent Owner nor Mr. Balassanian indicates that the two inventors are authors of these documents. Because the documents do not indicate their date of creation, Patent Owner relies on metadata showing the documents were created on November 9 or November 14 of 2001. See Ex. 2077 at 23–26. These dates occur after Patent Owner contends the source code that practices the claim limitations had already become fully operational and, thus logically, also after the invention would have already been conceived. PO Resp. 20–21 (citing Ex. 2001 ¶¶ 37–38; Ex. 2013 at 2; Ex. 2080 ¶¶ 39–49). None of the Strings Audio Player demonstration documents, save the audioplayerapp.rule document, refers to synchronization at all. See generally Exs. 2025–27, 2034. The audioplayerapp.rule mentions synchronization only by referring to source code modules such as clocksync. See Ex. 2028 at 2.

The cited case study document similarly does not list an author. See Ex. 2029. Again, the document itself has no indication of a date, but Patent Owner, relying on metadata, contends the document was created by December 3, 2001 (PO Resp. 23 (citing Ex. 2077 at 28–30)), which is after Patent Owner contends the invention was conceived.

The remaining document mentioned in Patent Owner's Response is "synchronization.doc," which

was filed on December 17, 2001, as the provisional application to which the '252 Patent claims priority and which Patent Owner contends was drafted at least as early as December 9, 2001. The evidence shows, however, that the December 9 version of this document, which appears to be the version that was the basis for the provisional application, was authored by non-inventor Mr. Carpenter. See Ex. 2038 ("After talking with Guy and rereading the /docs/synchronization.doc document he wrote, I think it is sufficient for the patent provisional as is."); Ex. 2077 at 35 (listing "guyc" as last saving the document).

Patent Owner argues that the Fight Club demonstrations occurred prior to December 11, 2001, and Mr. Balassanian recalls that he participated in these demonstrations from September 2001 forward. PO Resp. 24 (citing Ex. 2001 ¶ 56). We agree with Petitioner that Mr. Balassanian's testimony is largely uncorroborated. But even assuming that the demonstrations occurred in the time frame recalled by Mr. Balassanian and that the demonstrations operated to synchronize content over multiple devices, the evidence as a whole does not support the conclusion that Mr. Balassanian or Mr. Bradley conceived of the synchronization technology behind the demonstrations. The occurrence of the demonstrations as recalled by Mr. Balassanian does not corroborate his testimony regarding conception itself.

Ultimately, Patent Owner relies on BeComm source code, more than any other piece of evidence, to corroborate both conception and reduction to practice.

PO Resp. 26–31. Patent Owner highlights three source code modules, "audiosync," "timesync," and "clocksync," as forming "the central core of BeComm's embodiment of the Challenged Claims." PO Resp. 20. These modules, Patent Owner contends, were fully operational to synchronously render content over multiple devices by the end of October 2001. PO Resp. 21. These source code modules are also the modules that Patent Owner contends were used for the Fight Club demonstrations (PO Resp. 25), and that are referenced in documents such as the "Using Strings" document (see Ex. 2021 at 9). Dr. Hashmi analyzed these modules, amongst others, in opining that BeComm source code dated November 2001 practices the claim limitations. Ex. 2080 ¶ 18. However, as Petitioner points out, each of these modules lists Mr. Carpenter as the sole author. Pet. Reply 9 (citing Exs. 2017, 2019, 2020 (showing that "Guy Carpenter (guyc)" as the owner)). Neither Mr. Balassanian nor Mr. Bradley is listed as an author, and Patent Owner does not present any evidence that either of the two inventors contributed to writing the source code.

Petitioner first raised the inurement issue in its Reply Brief. Pet. Reply 9. Patent Owner did not respond to the inurement issue at all in its briefing. See generally PO Sur-Reply. Patent Owner briefly addressed inurement at the oral hearing and argued that it would be "a matter of common sense" that Mr. Carpenter would have written the source code on behalf of Mr. Balassanian given that Mr. Balassanian was the CEO of BeComm and that Mr. Carpenter was BeComm's Master Engineer. Tr. 67:1–15. Even if this is true, as we explained above, inurement

requires a showing that the inventors conceived of the invention in order for them to benefit from Mr. Carpenter's work. The record, however, does not support that the Patent Owner made such a showing.

In summary, none of the BeComm internal documents, demonstrations of BeComm technology, or BeComm source code corroborate Mr. Balassanian's testimony that he and Mr. Bradley conceived of the challenged claims or that they communicated the inventions to Mr. Carpenter. Considering the record before us as a whole, we determine that Patent Owner fails to meet its burden of producing evidence sufficient to show conception by Mr. Balassanian and Mr. Bradley and, therefore, that Mr. Carpenter's actions inure to the benefit of the inventors.

Thus, we find that Patent Owner fails to provide sufficient support for antedating Janevski. Accordingly, we agree with Petitioner that Janevski serves as prior art to the '252 Patent. Under these circumstances, it is not necessary to reach the issue of whether BeComm source code practices the claim limitations.

D. Obviousness

Petitioner argues claims 1–3, 8, 11, and 17 would have been obvious over the cited prior art references. Pet. 35–68. To support its contentions, Petitioner provides an explanation of how Janevski teaches each limitation of the challenged claims, except for the limitation requiring to "smooth a rendering time differential that exists between the master rendering device and the first slave device" (the "smoothing element") of independent claims 1 and 11. According

to Petitioner, however, the smoothing aspect of the independent claims would have been an insignificant advance over Janevski alone, or would have been obvious over the teachings of Azevedo, Mills, Berthaud, Eidson, or Baumgartner. Id. Petitioner also relies on the declaration of Dr. Roman Chertov (Ex. 1009, "Chertov Decl.") in support of its arguments. We discuss each of Petitioner's challenges below.

A patent 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 the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To be relevant, evidence of nonobviousness must be commensurate in scope with the claimed invention. In re Huai–Hung Kao, 639 F.3d 1057, 1068 (Fed. Cir. 2011). Thus, to be accorded substantial weight, there must be 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). "For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the

evidence and the merits of the claimed invention." Kao, 639 F.3d at 1068. The stronger the showing of nexus to the claimed invention, the greater the weight accorded the objective indicia of nonobviousness. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 306 (Fed. Cir. 1985). We apply "a [rebuttable] presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product 'is the invention disclosed and claimed in the patent.'" *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1329 (Fed. Cir. 2016) (citing J*.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 105 F.3d 1563, 1571 (Fed. Cir. 1997).

Ground 1: Obviousness over Janevski Alone
1. Overview of Janevski

Janevski is directed to "techniques for synchronizing playback of two or more digital streams based on renderable content of those streams." Ex. 1007, 1:8–11. Janevski describes a situation in which two or more individuals watch content recorded on their personal video recorders (typically television broadcasts) at different locations simultaneously while communicating over the phone about the content being watched. Id. at 1:38–44. Janevski notes that one possible problem that may occur in this situation is that the content being played at the respective locations may fall out of synch with each other and therefore affect the enjoyment of watching a program simultaneously together. Id. at 1:44–52. Janevski, therefore, "provides a system that allows two or more people with personal video recorders (PVRs) to precisely synchronize their time-shifted

viewing." Id. at 5:3–5.

In Janevski's system, certain PVRs are designated as "initiators," while others are referred to as "participants." Id. at 6:16–18. The initiator is initially the PVR that starts the session, but the role of the initiator is handed off to any PVR that performs a control function such as stop, pause, fast forward, or reverse. Id. at 6:18–25. "To ensure that the PVRs . . . participating in a session remain synchronous, a status message is sent out periodically by the 'initiator.'" Id. at 7:36–39. The status message includes "an indication of the program being watched, the current mode of watching (e.g., normal play, fast forward, pause), an indication of the time into the program, and information characteristic of content of a digital bit stream from which playback to the message sender is being generated." Id. at 7:41–46.

Janevski describes a two-phase synchronization method, the first phase of which is to perform time synchronization and the second phase of which is to fine tune the time synchronization by performing frame synchronization. Id. at 7:47–50, 9:10–14, 10:28–35. Janevski describes one embodiment of the time synchronization phase in which a time misregistration is calculated. The time misregistration is a difference or misalignment of the video timers of the PVRs and is calculated using information in messages sent between initiator and participant PVRs. See id. 9:15–10:3. A participant compensates for the time misregistration by advancing or rolling back the time count of its video timer to synchronize with the initiator. Id. at 12:59–13:7. Although Janevski describes one way of

performing time synchronization, Janevski notes that "[t]ime synchronization can be implemented in many different known ways," and cites to Azevedo as a reference describing examples of certain clock synchronization techniques. Id. at 8:53–59.

After time compensation, the process proceeds to the frame synchronization phase, which entails finding the frame in the participant's stream that most closely matches the initiator's frame. Id. at 10:52–62. This is done by determining frame misregistration, which is described as "the content-wise misalignment of two playbacks." Id. at 10:58–60. The participant then compensates for such frame misregistration by fast forwarding or rewinding playback so that synchronization is achieved. Id. at 10:52–62, 13:24–26, 15:22–26.

2. Independent Claims 1 and 11

Based on our review of the record, we are persuaded Petitioner has provided sufficient evidence that Janevski discloses each of the limitations of claim 1, and analogously of claim 11, except we are unpersuaded that Janevski renders obvious the smoothing aspect of these claims. For this reason, we are ultimately unpersuaded by Petitioner's Ground 1 challenge over Janevski alone. Claim 11 recites limitations that are analogous to those recited in claim 1 and Petitioner relies on largely the same arguments as those made for the corresponding limitations of claim 1 (see Pet. 50–55), thus, in our analysis below, we refer primarily to claim 1 of the '252 Patent.

Claim 1 recites "[a] method comprising: a master rendering device rendering a first content stream."

Petitioner argues Janevski discloses a master rendering device that renders a first content stream by designating certain PVRs as the "initiator" and other PVRs as participants. Pet. 36 (citing Ex. 1007, Fig. 1, 6:4–25). The initiator and participant PVRs in Janevski receive broadcasts of video content that take the form of digital bit streams then play back their respective bit streams in a synchronized manner. Pet. 37 (citing Ex. 1007, Fig. 1, Abstract, 1:8–11, 5:3–32, 6:4–25, 15:64–16:5, 16:35–37, 16:44–52). According to Petitioner, "the 'initiator' PVR playing back a 'digital bit stream' amounts to the claimed functionality of a 'master rendering device rendering a first content stream.'" Pet. 37.

We agree with Petitioner that Janevski's initiator PVRs teach the claimed "master rendering device" and the participant PVRs teach the claimed "plurality of slave devices." The '252 Patent describes the relationship between the master rendering device and the slave rendering devices as one where the slave device "adjusts the rendering of its content to keep it in synchronization with the rendering of the content at the master rendering device." Ex. 1001, 2:36–38. This is precisely what the participant devices in Janevski do relative to the initiator device. See e.g., Ex. 1007, Fig. 6 (showing that participant device advances its time count to match the stamp from the initiator device).

Claim 1 also recites "sending from the master rendering device to a first one of a plurality of slave devices, a plurality of master rendering times indicative of statuses of the rendering the first content stream at the master rendering device at

different times." Petitioner argues Janevski teaches this limitation because its initiator PVRs send periodic status messages to participant PVRs and the status messages include the initiator's "time into the [video] program," and Janevski also discloses that the status messages include "query time stamps." Pet. 37–38 (citing Ex. 1007, Abstract, 7:36– 50, 10:19–35, 12:5–36).

We are persuaded by Petitioner's mapping of the aforementioned limitation to Janevski. Janevski discloses that the initiator device sends a status message to participant devices where the status message includes, amongst other things, a "time into the program." Ex. 1007, 7:41–44. We agree with the Petitioner that the status message's "time into the program" teaches the claimed "master rendering time" that is sent from an initiator device (i.e., a "master rendering device") to the participant devices (i.e., a "slave device").

Claim 1 further recites:

wherein the first slave device is configured to smooth a rendering time differential that exists between the master rendering device and the first slave device in order to render a second content stream at the first slave device synchronously with the rendering of the first content stream at the master rendering device, wherein smoothing the rendering time differential includes calculations using the plurality of master rendering times.

Petitioner argues Janevski teaches every aspect of this claim element, other than the smoothing

element. Pet. 38–39. We agree. In particular, Petitioner argues Janevski discloses that each participant PVR periodically determines whether there is a misalignment between the initiator PVR's video content and its own video content and, if so, synchronizes the video content. Pet. 39 (citing Ex. 1007, Abstract, 7:36–50, 10:36–60, 12:59–13:29, 15:32–33). The synchronization includes the steps of determining a time misregistration (i.e., a difference in the time counts of the PVRs) and compensating for the time misregistration by adjusting the participant's time count. Pet. 39–40 (citing Ex. 1007, Abstract, 7:36–50, 8:39–10:3, 10:19–35, 11:43–12:4, 12:5–36, 12:59–13:21). The steps further include calculating a frame misregistration (i.e., a differential between the video frames that have been rendered by the initiator PVR and the video frames that have been rendered by the participant PVR), and compensating for this frame misregistration by slowing down, speeding up, rewinding, fast-forwarding, and/or halting its rendering of the video content. Pet. 40 (citing Ex. 1007, Abstract, 3:52–57, 10:60–62, 13:24–30, 14:35–63). Petitioner contends that the foregoing establishes that the calculated values for both time count differential and frame differential are used by the participant PVR to render video content synchronously with the initiator PVR and that the time count differential and the frame differential each separately amounts to "two or more calculated values for a differential between a time measure of a master rendering device and a corresponding time measure of the first slave device." Pet. 41– 42 (citing Ex. 1009 ¶¶ 117–118).

We agree with Petitioner that Janevski's time misregistration teaches the claimed "time differential" between the master and slave devices. Indeed, the formula used to calculate Janevski's time misregistration (Ex. 1007, 9:34 ("TM=1/2 [(A+D)– (C+B)]")) is similar to the formula used to calculate the '252 Patent's "time differential" (Ex. 1001, 5:37 ("Diff=((RT1ST1)+ST2-RT2)/2")).

We do not agree with Petitioner's alternative contention that Janevski's frame misregistration also teaches the claimed "time differential." Janevski's frame misregistration "refer[s] to the content-wise misalignment of two playbacks." Ex. 1007, 10:59–60. In other words, frame misregistration represents the frame count differential between the target query frame of the initiator and the identified participant frame that is most similar content-wise to the initiator's query frame. We disagree that frame misregistration would teach the claimed time differential to one of ordinary skill in the art. Nevertheless, because we agree that Janevski's time misregistration teaches the claimed "time differential," we are persuaded by Petitioner's contentions regarding this limitation.

Petitioner acknowledges that "[t]he only aspect of [the above claim element] not expressly disclosed by Janevski is the 'smoothing' function." Pet. 42. However, Petitioner contends that applying a smoothing function to either the time count differential or the frame differential would be an insignificant advance over Janevski because smoothing (e.g., by averaging or filtering) was a conventional technique well within the knowledge of

the ordinarily skilled artisan used for reducing volatility in a set of measured values. Pet. 43 (citing Ex. 1009 ¶¶ 120–121; Ex. 1015; Ex. 1016). Petitioner relies on Dr. Chertov's testimony that if the participant PVR in Janevski were configured to calculate an average of the last two or more calculated values of either the time count or frame differential, or to apply a filter to these values before using them, then the participant PVR would be "smoothing" the values. Ex. 1009 ¶ 120. Dr. Chertov cites to certain textbooks and publications discussing methods for data smoothing as evidence that a person of ordinary skill would have had knowledge of smoothing techniques used to smooth data. Ex. 1009 ¶ 122 (citing Exs. 1015, 1016).

Patent Owner argues that it is undisputed that Janevski does not disclose the "smoothing" elements and reminds us that for this reason, we did not find this ground persuasive in our Decision to Institute. PO Resp. 32. Patent Owner does not present any further arguments against this ground and instead focuses on Petitioner's other grounds.

We are unpersuaded that one of skill in the art would have been motivated to smooth the time count differential based on Janevski's disclosure alone. We find Petitioner's arguments improperly guided by hindsight in light of the smoothing aspect of the challenged claims. See In re Fritch, 972 F.2d 1260, 1266 (Fed. Cir. 1992) ("It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." (citation omitted)).

Petitioner contends that smoothing was a well-known technique for reducing volatility in a set of measured values. Pet. 43. Although this statement may be true, in general, for the instance where Janevski is considered alone, no persuasive evidence is provided that smoothing would have been applied to the values of time count differential in the specific context of synchronizing clocks or content streams. For example, although the textbook and publication relied upon by Dr. Chertov mention data smoothing, they do not do so in the context of synchronization. See Ex. 1015 (discussing data smoothing in the context of the "measurement of energy spectra"); see also Ex. 1016 (discussing smoothing generally in statistics but failing to discuss its application in synchronization). Besides hindsight reconstruction, Petitioner does not present sufficient evidence why one of ordinary skill in the art, even equipped with the knowledge of smoothing, would have applied it to clock synchronization or content stream synchronization. Further, although Dr. Chertov testifies that by simply averaging or filtering the last few time count and frame differential values, Janevski's PVRs would be practicing the smoothing limitation, insufficient evidence is put forth of a reason why one of ordinary skill would have been motivated to average or filter Janevski's time count and frame differential values. Janevski alone does not mention the benefits of averaging or filtering the time count and frame differentials once those values are obtained.

Petitioner has shown, by a preponderance of the evidence that Janevski teaches every limitation of

claims 1 and 11, except for the recited smoothing element. We are not persuaded that Janevski alone would render the smoothing limitation obvious. Thus, we conclude that the Petitioner has not presented sufficient evidence to support the Ground 1 challenge of claims 1 and 11, and claims 2, 3, 8, and 17, which depend from one of claims 1 and 11, as obvious over Janevski alone under a preponderance of evidence standard.

Grounds 2–5: Obviousness over Janevski and Each One of Azevedo, Mills, Berthaud, and Eidson

1. Overview of Azevedo

Azevedo is directed to fault tolerant clock synchronization in a distributed system. Ex. 1010, 1. Azevedo explains that in a distributed computer system, time synchronization is important and must be maintained in spite of the presence of faults in the system. Id. Fault tolerant clock synchronization may be achieved "via interactive convergence algorithms in which nodes exchange their clock values and determine clock correction terms at regular intervals." Id. Azevedo presents the measured performance of three interactive convergence algorithms, one of which is identified as "the adaptive exponential averaging fault-tolerant midpoint algorithm" ("AEFTMA"). Id. AEFTMA includes a weight factor that "smooths" the clock correction term. Id. at 4.

2. Overview of Mills

Mills, a 1992 reference, is directed to a Network Time Protocol ("NTP"), "which is used to synchronize timekeeping among a set of distributed time servers

and clients. It defines the architectures, algorithms, entities and protocols used by NTP and is intended primarily for implementors." Ex. 1011, 1. Section 4 of Mills "describes algorithms useful for deglitching and smoothing clock-offset samples collected on a continuous basis." Id.

3. Overview of Berthaud

Berthaud "presents a general time synchronization algorithm that analyzes the time offset between any two computers' clocks in a network and its evolution, by using mathematical topology properties." Ex. 1012, 265. Berthaud discloses synchronization between master and slave devices by measuring time offset between their clocks. An estimate of a clock offset is produced from a set of observations "and several tools may be used in the estimation evaluation process, such as: mean value, weighted average, linear regression, midpoint functions, etc." Id. at 266. The "estimation is used to determine the amount by which a slave should adjust its local clock." Id.

4. Overview of Eidson

Eidson "relates to enhancements to time synchronization in distributed systems." Ex. 1013, 1:9–10. "The enhancements include techniques that compensate for jitter associated with communication circuitry in the distributed system including jitter associated with physical interfaces and gateways in the distributed system." Ex. 1013, Abstract. Eidson describes that "[o]ne method for reducing the negative effects of jitter . . . is to average the differences computed between the time value in the time-stamp latch and the time-stamp . . . ." Id. 4:16–21. Eidson

explains that the averaged result is then used to adjust the local clock. Id. 4:30–32.

5. Independent Claims 1 and 11

a. Petitioner's Contentions

As before, Petitioner argues Janevski teaches each of the limitations of claims 1 and 11, except for the smoothing element of these claims. Pet. 42. As explained above, we ultimately agreed with Petitioner that Janevski teaches the limitations of claims 1 and 11 except the smoothing function. For the smoothing element of claim 1, Petitioner argues any one of Azevedo, Mills, Berthaud, and Eidson ("the clock synchronization references") teaches the smoothing element and applies it to various clock variables.

According to Petitioner, Janevski discloses that time synchronization between initiator and participant PVRs "can be implemented in many different known ways" and Janevski identifies Azevedo as disclosing some examples of these known ways. Pet. 44 (citing Ex. 1007, 8:53–59). Azevedo relates to fault tolerant clock synchronization in a distributed system. Ex. 1010, 1. One of the examples disclosed in Azevedo involves the computation of a weighted average of certain clock correction terms in order to smooth the clock correction terms, so that volatility is attenuated. Pet. 44 (citing Ex. 1010, 1–4).

According to Petitioner, "Janevski's citation to the Azevedo paper provides further support for the conclusion that modifying a 'participant' PVR such that was configured to calculate a weighted average of the periodically-calculated values for either the

'time count' differential or the 'frame' differential would have been nothing more than a trivial change for a PHOSITA." Pet. 44–45 (citing Ex. 1009 ¶ 122). Petitioner also argues that Janevski repeatedly emphasizes the goal of providing precise synchronization. Pet. 46 (citing Ex. 1007, Abstract, 3:43–57, 5:3–5). Hence, according to Petitioner, "it would have been well known to a PHOSITA in 2001 that applying data smoothing to a periodically-calculated data variable would reduce volatility of such periodic calculations and thereby improve the overall accuracy of the calculation." Pet. 45 (citing Ex. 1009 ¶ 124). Petitioner concludes, and we agree, that, in light of Janevski's goal of providing precise synchronization, a person of ordinary skill would have been motivated to modify Janevski to use smoothing to reduce volatility and improve the accuracy of calculating Janevski's time count or frame differentials. Pet. 46 (citing Ex. 1009 ¶ 125).

For similar reasons, Petitioner argues that one of ordinary skill would have combined Janevski with either Mills, Berthaud, or Eidson to smooth Janevski's time count differential to reduce volatility and provide precise synchronization. Pet. 59–64. Mills, Berthaud, and Eidson relate to synchronizing clocks of devices in a distributed network, just as Azevedo does. Pet. 59–63. Petitioner argues that "the nature of the problem to be solved by Janevski relates to accuracy of synchronizing playback between rendering devices that are nodes in a distributed network, and Mills, Berthaud, and Eidson all disclose mechanisms for improving the accuracy of 'time synchronization' between nodes in a distributed

network." Id. at 64 (citing Ex. 1009 ¶ 166). Each, according to Petitioner, applies smoothing in their respective synchronization techniques, thus one of ordinary skill in the art would have combined Mills, Berthaud, or Eidson with Janevski to smooth the periodically calculated values for Janevski's time count differential between initiator and participant PVRs. Id. (citing Ex. 1009 ¶ 167).

b. Patent Owner's Arguments

Patent Owner does not present any arguments regarding whether Janevski and the clock synchronization references teach any of the specific limitations of claims 1 and 11 as asserted by Petitioner. Instead Patent Owner argues Janevski teaches away from the clock synchronization references and that objective indicia of nonobviousness show that the claims would not have been obvious.

Patent Owner argues that Janevski "teaches away from using deviceclock-based smoothing techniques such as those in the secondary references." PO Resp. 33. This is because, according to Patent Owner, "Janevski expressly cites Azevedo as a technique in which distributed processors in network can 'broadcast their respective clock values periodically to maintain synchronization'" but instead uses a different twostep technique. Id. Patent Owner contends that "if it would have been obvious to modify the Janevski system to smooth a rendering time using techniques like Azevedo, Mr. Janevski would have disclosed those techniques or incorporated those techniques by reference into his patent since he was aware of Azevedo." Id. at 34.

With respect to objective indicia of obviousness, Patent Owner argues "[p]rior to the inventions of the Challenged Claims, there was an unmet need for a solution to synchronize across multiple devices the playback of audio and video received from a source." PO Resp. 35 (citing Ex. 2001 ¶¶ 26–30; Ex. 2009 at 15; Ex. 2012 at 37–38). Patent Owner points to the early Juno documents stating that "[b]oth Jupiter and BeComm recognize that true synchronization is an unsolved computer science problem" as evidence of the invention's long-felt need. PO Resp. 36 (citing Ex. 2009 at 14–15; Ex. 2001 ¶¶ 29–30). Patent Owner claims that this evidence indicates that Intel had not solved the synchronization problem and thus, a solution was not obvious at the time. PO Resp. 36.

Patent Owner next argues that Intel's willingness to pay $850,000 and share 5% of Intel's Consumer Products Division revenue with BeComm is more evidence of nonobviousness. PO Resp. 36–37 (citing Ex. 2001 ¶ 29). Patent Owner also points to licensing of the patented technology to various technology companies as evidence of nonobviousness. PO Resp. 37. Finally, Patent Owner argues that companies that used the claimed synchronization technology have achieved significant commercial success. PO Resp. 37.

c. Analysis

We find Petitioner has shown by a preponderance of the evidence that claims 1–3, 8, 11, and 17 are unpatentable over Janevski combined with each one of the clock synchronization references. Petitioner has provided sufficient evidence that Azevedo, Mills, Berthaud, and Eidson teach synchronization

techniques that involve smoothing of various clock variables. Specifically, we agree that Azevedo relates to fault tolerant clock synchronization in a distributed system. Ex. 1010, 1. One of the examples disclosed in Azevedo involves the computation of a weighted average of certain clock correction terms in order to smooth the clock correction term, so that volatility is attenuated. Pet. 44 (citing Ex. 1010, 1–4). Similarly, Mills relates to a NTP, "which is used to synchronize timekeeping among a set of distributed time servers and clients." Ex. 1011, 1. Section 4 of Mills "describes algorithms useful for deglitching and smoothing clock-offset samples collected on a continuous basis." Id. Moreover, Berthaud discusses synchronization between master and slave devices by measuring time offset between their clocks. Ex. 1012, 266. In Berthaud, an estimate of a clock offset is produced from a set of observations "and several tools may be used in the estimation evaluation process, such as: mean value, weighted average, linear regression, midpoint functions, etc." Id. As Petitioner contends and Dr. Chertov testifies (Ex. 1009 ¶ 159), we agree that references to "mean value, weighted average, linear regression, midpoint functions, etc." refer to various smoothing techniques. And finally, we agree with Petitioner's contention that Eidson "relates to enhancements to time synchronization in distributed systems." Ex. 1013, 1:9–10. "The enhancements include techniques that compensate for jitter associated with communication circuitry in the distributed system including jitter associated with physical interfaces and gateways in the distributed system." Id., Abstract. Eidson describes that "[o]ne

method for reducing the negative effects of jitter . . . is to average the differences computed between the time value in the timestamp latch and the time-stamp." Ex. 1013, 4:16–21. By averaging the differences between time values, the evidence supports that Eidson teaches smoothing the time value differences.

Although Patent Owner is correct that the clock synchronization references do not specifically teach smoothing a rendering time differential, Petitioner is not relying on these references for such a teaching. Instead, Petitioner relies on each of the clock synchronization references as teaching the general technique of smoothing clock differentials and applies such a technique to Janevski's rendering time differentials. See Pet. 44–47, 58–59, 63–64.

Petitioner articulates a reason with rational underpinning for combining Janevski with the clock synchronization references. In this regard, Petitioner notes that, according to Janevski, time synchronization between the PVRs can be implemented in many different known ways and provides, as examples of such techniques, the various clock synchronization techniques disclosed in Azevedo. Pet. 44. We agree. Unlike the Ground 1 challenge based on Janevski alone, here there is an explicit connection between smoothing techniques and applying them to clock synchronization. Janevski states "[t]ime synchronization can be implemented in many different known ways" (Ex. 1007, 8:53–54) and explicitly refers to Azevedo as disclosing one such way (Ex. 1007, 8:54–59). Thus, Janevski itself indicates that clock synchronization techniques may be

applicable to synchronizing video timers. See Ex. 1007, 8:39–64. Janevski's reference to Azevedo would have led one of ordinary skill in the art to Azevedo's discussion of smoothing as applied to Azevedo's clock correction terms, which one of skill could then readily have applied to Janevski's time misregistration. Once exposed to smoothing techniques as applied in Azevedo, one of ordinary skill would reasonably have looked to other references, such as Mills, Berthaud, and Eidson that also teach smoothing in the context of clock differentials.

(i) Teaching Away

We do not find Patent Owner's argument that Janevski teaches away from the clock synchronization references to be persuasive. Rather than teaching away, Janevski expressly draws the reader's attention to Azevedo as an alternative way of performing time synchronization. See Ex. 1007, 8:39–64. The fact that Janevski does not adopt Azevedo's technique is not tantamount to teaching away from it. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) ("The prior art's mere disclosure of more than one alternative does not constitute teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed"); In re Mouttet, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[T]he mere disclosure of alternative designs does not teach away" and "just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."). Moreover, Patent Owner does not contend that Janevski criticizes, discredits, or discourages smoothing in general or as disclosed in

Azevedo, Mills, Berthaud, or Eidson, nor do we find any such criticism or discouragement.

(ii) Objective Indicia of Nonobviousness

The *Graham* factors instruct that we must consider—apart from what the prior art itself would have suggested—whether objective evidence of nonobviousness (i.e., secondary considerations), when present, may lead to a conclusion that the challenged claims would not have been obvious. *See, e.g., Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538–39 (Fed. Cir. 1983) (instructing that evidence of secondary considerations, when present, must always be considered in determining obviousness). It is only a part of the "totality of the evidence"; its mere existence does not control the conclusion of obviousness. *See Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1483 (Fed. Cir. 1997) (citations omitted). Objective evidence of nonobviousness "may often be the most probative and cogent evidence in the record" and "may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). Objective evidence of nonobviousness may include evidence of commercial success, licensing, copying, praise by others, longfelt but unresolved need, and failure by others. Graham, 383 U.S. at 17–18. Objective evidence of nonobviousness "is only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].'" In re *Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco*

Corp. v. Align Tech., Inc., 463 F.3d 1299, 1312 (2006)). "[T]here is no nexus unless the evidence presented is 'reasonably commensurate with the scope of the claims.'" Id. (citing *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013) (quoting *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011)).

Long-Felt Unmet Need

Patent Owner argues "there was an unmet need for a solution to synchronize across multiple devices the playback of audio and video received from a source." PO Resp. 35 (citing Ex. 2001 ¶¶ 26–30; Ex. 2009 at 15; Ex. 2012 at 37–38).

In order to show a long-felt but unmet need for the claimed invention, the objective evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 538 (CCPA 1967). Patent Owner's evidence shows that there was a need by BeComm for synchronization at least around the time of the Juno project in late 2000 and early 2001. However, Patent Owner does not present sufficient evidence showing that this need was persistent, long-felt, or recognized generally by persons of ordinary skill in the relevant art. The Juno documents are dated only one year before the priority date of the '252 Patent and no evidence is presented showing that the need for synchronization extended any further back in time. *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1377 (Fed. Cir. 2000) (finding a one-year time between identification of the problem and patented solution was insufficient to show "a long-felt need"). Moreover, an internal BeComm document reflecting the knowledge of employees at one company

is not enough to show general recognition of an unmet need in the relevant technical field.

Intel's Partnership and Licensing

Patent Owner argues that Intel's willingness to pay $850,000 and share 5% of Intel's Consumer Products Division revenue with BeComm is more evidence of nonobviousness. PO Resp. 36–37 (citing Ex. 2001 ¶ 29). However, Patent Owner fails to establish a nexus between Intel's payment to BeComm and the claimed invention. Juno was intended to provide a subset of the functionality of a larger home audio network that enables audio services in the home environment. Ex. 2009, 7–8. Juno provided transcoding and decoding of content, including encryption, decryption, compression, and decompression. Ex. 2009, 8. Juno also provided routing capability for routing content to the appropriate adapter, and also ensured that high quality audio was delivered to the adapters. Ex. 2009, 8. The aforementioned features are all unrelated to the '252 Patent. Patent Owner does not provide any information regarding how much of Intel's payment can be attributed to the specific claimed features of the '252 Patent.

Similar to its prior arguments, Patent Owner's argument regarding licensing also fails to provide sufficient evidence demonstrating a nexus between the licenses and the merits of the claimed invention. No evidence is provided other than the inventor's uncorroborated testimony that patents that stem from his work were licensed. The licenses and licensed patents are not presented as evidence so that a determination could be made as to how the claimed

invention contributed to the licenses and their total value.

Commercial Success

Finally, although Patent Owner argues that companies that used the claimed synchronization technology have achieved significant commercial success (PO Resp. 37), the only company Patent Owner identifies is Petitioner, which it alleges uses synchronization technology that meets the claim limitations. PO Resp. 37–38. As before, insufficient evidence is provided to show a nexus between Petitioner's commercial success and the claimed features of the '252 Patent. Other than one mention of synchronization in Petitioner's annual report, Patent Owner does not present evidence showing the extent to which synchronization or the smoothing features of the challenged claims contributed to Petitioner's revenue and profit margin.

In summary, we do not find Patent Owner's arguments regarding objective indicia of non-obviousness to be persuasive.

d. Conclusion

Having reviewed Petitioner's and Patent Owner's arguments and evidence, we find that Petitioner has established that Janevski and the clock synchronization references teach the limitations of claims 1 and 11 and has provided a persuasive rationale to combine the references. We have considered the objective indicia of non-obviousness and accorded them appropriate weight along with all of the Graham factors, and we agree with Petitioner that claims 1 and 11 would have been obvious over

Janevski combined with Azevedo, Mills, Berthaud, or Eidson.

6. Dependent Claim 2

Claim 2 depends from claim 1 and recites "wherein one of the plurality of master rendering times includes a master device time at which the master rendering device renders content."

Petitioner argues, and we agree, that Janevski teaches the limitations of claim 2 because it discloses "that the 'initiator' PVR (the 'master rendering device') periodically sends each 'participator' PVR a 'status message' that contains an indication of the 'initiator' PVR's 'time into the [video] program' as well as a 'query time stamp' for 'a frame that the initiator has just played or has recently played.'" Pet. 48 (citing Ex. 1007, Abstract, 7:36–50, 10:19–35, 12:5–36; Ex. 1009 ¶ 129).

Patent Owner argues Janevski "fails to disclose the 'master device time' limitation of claim 2." PO Resp. 38. Patent Owner argues that under the proper construction, the claim term "device time" refers to a time as indicated by a designated clock on the device, and that "Janevski does not indicate if the query time stamp contains a time indicated by a designated clock of any particular device, let alone the initiator device." PO Resp. 39.

Petitioner responds that there is no difference in scope between the parties' proposed constructions because even under Patent Owner's construction, "there is no limitation on what kind of clock can be 'a designated clock.'" Pet. Reply 26. Petitioner argues that Janevski's "query time stamp" is a "time value

indicated by [a] clock of a given rendering device" and cites the testimony of its expert, Dr. Chertov, and Janevski for support. Pet. Reply 26 (citing Ex. 1007, 11:66–12:8, 12:18–29).

We agree with Petitioner that Janevski's query time stamp, included in the status message sent from the initiator PVR to the participant PVR, teaches the claimed "a master device time at which the master rendering device renders content." The time stamps discussed in Janevski, including those found in Figure 4 and Figure 5, and therefore also including the query time stamp, originate from Janevski's video timer 212. See Ex. 1007, 9:18– 20 ("The message 402 is sent at a time A which is 0 hours, 0 minutes and 2 seconds according the video timer 212 of the initiator PVR 114a."). We find the video timer 212 of the initiator device teaches a "designated clock" of the claimed master device of claim 2, consistent with our construction of the term "master device time" because the video timer is designated to track the time of the video output of Janevski's PVRs. See Ex. 1007, 2:16– 20. The query time stamp is the time stamp of the query frame and the query frame is the frame that is rendered on the initiator device. See Ex. 1007, 10:36– 41 ("[T]he signature to be compared to the query signature . . . is the signature of the I frame of the participant PVR 114b whose time stamp is closest to the time stamp 590 of the query frame."). The time stamp of the query frame is thus the time of the video timer at which the initiator renders content. Thus, we agree with Petitioner that Janevski's query time stamp teaches "a master device time at which the master rendering device renders content."

7. Dependent Claim 3

Claim 3 depends from claim 1 and recites "wherein sending the plurality of master rendering times comprises sending a series of transmissions to the first slave device, each one of the series of transmissions being at a different time."

Petitioner asserts, and we agree, that Janevski teaches the additional limitations of claim 3 because it discloses that status messages, which contain the time into the video program and the query time stamp, are sent periodically from initiator to participant PVR. Pet. 48 (citing Ex. 1007, 7:36–38, 15:32–33). According to Petitioner, the periodic transmission of status messages from initiator to participant PVR amounts to "sending the plurality of master rendering times comprises sending a series of transmissions to the first slave device, each one of the series of transmissions being at a different time." Id. at 49 (citing Ex. 1009 ¶ 130).

Patent Owner does not present arguments against Petitioner's contention that Janevski and the clock synchronization references teach the specific limitations of claim 3. See generally PO Resp. We agree with, and adopt as our own findings and conclusions, Petitioner's evidence and analysis, summarized above, which we determine show by a preponderance of the evidence that Janevski teaches the additional limitations of claim 3.

8. Dependent Claim 8

Claim 8 depends from claim 1 and recites "wherein the first content stream is sent from a first source device to the master rendering device and the

second content stream is sent to the first slave device from a difference source device."

Petitioner asserts, and we agree, that Janevski discloses that the "initiator" and "participant" PVRs (the "master rendering device" and "slave rendering device," respectively) each receive respective broadcasts of "digital bit streams" that may be sent by "different cable or satellite providers." Pet. 49 (citing Ex. 1007, 3:13–16, 6:5–39, 16:44–52). Petitioner contends "[b]ecause these 'different cable or satellite providers' amount to different sources, this disclosure amounts to the claim functionality of 'the first content stream [being] sent from a first source device to the master rendering device and the second content stream [being] sent to the first slave device from a difference source device.'" Pet. 49 (citing Ex. 1009 ¶ 131).

Patent Owner does not present arguments against Petitioner's contention that Janevski and the clock synchronization references teach the specific limitations of claim 8. See generally PO Resp. We agree with, and adopt as our own findings and conclusions, Petitioner's evidence and analysis, outlined above, which we determine show by a preponderance of the evidence that Janevski teaches the additional limitations of claim 8.

9. Dependent Claim 17

Claim 17 depends from claim 11 and recites "wherein the master rendering device and the slave device are part of a same system."

Petitioner asserts, and we agree, that Janevski discloses a "synchronized PVR viewing system' that

includes both an 'initiator' PVR (which amounts to the claimed 'master rendering device') and a 'participant' PVR (which amounts to the claimed 'slave rendering device')." Pet. 56 (citing Ex. 1007, Fig. 1, 6:4–25). Thus, because the initiator and participant PVRs are part of the same "synchronized PVR viewing system," Petitioner argues Janevski teaches the additional limitations of claim 17.

Patent Owner does not present arguments against Petitioner's contention that Janevski and the clock synchronization references teach the specific limitations of claim 17. We agree with, and adopt as our own findings and conclusions, Petitioner's evidence and analysis, summarized above, which we determine show by a preponderance of the evidence that Janevski teaches the additional limitations of claim 17.

Ground 6: Obviousness over Janevski and Baumgartner

1. Overview of Baumgartner

Baumgartner discloses "[a] method and [system] for synchronizing audio and video data streams in a computer system during multimedia presentation." Ex. 1014, Abstract. "The method . . . periodically queries each driver for the current audio and video position (or frame number) and calculates the synchronization error. The synchronization error is used to determine a tempo value adjustment to one of the data stream designed to place the video and audio back in sync. . . . The method applies a smoothing function to the determined tempo value to prevent overcompensation." Ex. 1014, Abstract.

2. Claims 1–3, 8, 11, and 17

As before, Petitioner argues Janevski teaches all the limitations of the challenged claims, except for the smoothing element of the claims. Pet. 64. For "smoothing," Petitioner relies on Baumgartner and argues that its "application of a 'smoothing' function to a frame offset while synchronizing the rendering of two streams of multimedia frames" combined with Janevski's teachings would render the challenged claims obvious. Pet. 65 (citing Ex. ¶¶ 169–180).

Petitioner argues that Baumgartner discloses a method for synchronizing separate audio and video data streams. Pet. 65 (citing Ex. 1014, 6:18–20). In order to synchronize audio with video, Baumgartner calculates a synchronization error value, "which is essentially the number of frames by which the video frame position is in front of or behind the current audio frame position." Pet. 66 (quoting Ex. 1014, 6:50–55, 13:60–67). The synchronization error value is transformed into a video tempo value that adjusts the rendering of the video stream. Pet. 66 (citing Ex. 1014, 6:56–7:4). Petitioner argues that before performing the adjustment, Baumgartner "adjusts this video tempo value by applying a smoothing function, i.e., a weighted average of prior tempo values, to the determined tempo value." Pet. 66 (quoting Ex. 1014, 6:61–65).

Petitioner argues a person of ordinary skill in the art would have been motivated to combine Janevski's teachings with Baumgartner's teachings so that a smoothing function would be applied to the periodically calculated frame differentials between initiator and participant PVRs in Janevski. Pet. 67

(citing Ex. 1009 ¶ 176). Petitioner emphasizes that the '252 Patent, Janevski, and Baumgartner "all have the same objective, which is to synchronize playback of multiple streams of multimedia content" and all also "express a desire to improve the accuracy of synchronizing playback of multiple streams of multimedia content to improve user experience." Id. at 67–68.

Petitioner's arguments and supporting evidence contending that Baumgartner's smoothing of tempo value would be combinable with and applied to Janevski's frame differential are insufficient. It is Baumgartner's synchronization error value that most closely analogizes to Janevski's frame misregistration. See Ex. 1014, 6:50–55 (explaining that the synchronization error value "is essentially the number of frames by which the video frame position is in front of or behind the current audio frame position"). However, Baumgartner does not disclose smoothing of the synchronization error value. Instead, Baumgartner uses the synchronization error value to assign a tempo value, which is used to adjust the audio or video stream's tempo to achieve synchronization between the two. Ex. 1014, 6:39–65. Thus, it is not apparent, based on Petitioner's allegations and evidence relied upon, that smoothing of the tempo value would have suggested to one of ordinary skill in the art the smoothing of Janevski's frame differential because the two parameters are different. Further, we find Petitioner has not sufficiently explained how smoothing Janevski's frame differential would "improve the accuracy of synchronization playback of multiple streams" (Pet.

67), as Petitioner contends.

We therefore conclude, on the record before us, that the Petitioner has not presented adequate evidence and reasoning in support of its challenge of claims 1 and 11, and claims 2, 3, 8, and 17, which depend from one of claims 1 and 11, as obvious over Janevski in combination with Baumgartner.

E. Motion to Exclude

Petitioner filed a Motion to Exclude (Paper 30) two sets of exhibits: (1) Exhibits 2002–2009, 2011–2078, and 2083–2088, which Petitioner seeks to exclude on the ground that they are not properly authenticated, and (2) Exhibits 2081 and 2082 as being improperly incorporated by reference.

1. Exhibits 2002–2009, 2011–2078, and 2083–2088

Petitioner argues Exhibits 2002–2009, 2011–2078, and 2083–2088 were submitted by Patent Owner to corroborate Mr. Balassanian's testimony on conception and reduction to practice, but that Patent Owner fails to authenticate these exhibits with evidence that is not dependent solely on the testimony of Mr. Balassanian himself. Paper 30, 1–3.

Patent Owner argues that the exhibits do not rely on Mr. Balassanian's testimony alone. For example, Patent Owner points to metadata from the CVS source code repository system and the computer file system on which the exhibits were originally stored as providing independent evidence of authentication, including an indication of the dates when the exhibits were authored. Paper 33, 1–9. The only exhibit for which metadata is not presented is Exhibit 2038, an email chain that Patent Owner argues is dated on its

face and discusses another exhibit (Exhibit 2037) for which Patent Owner has submitted metadata. Paper 33, 9.

Petitioner, in its Reply, argues that the metadata is essentially part of the documents themselves, and that because these documents and the included metadata all come from Mr. Balassanian, they cannot constitute independent evidence of authenticity. Paper 34, 2–3. According to Petitioner, independent evidence of authenticity would need to come from someone other than the inventor. Id. at 2.

Federal Rule of Evidence 901(a) states that "[t]o satisfy the requirement of authenticating or identifying an item of evidence, the proponent must produce evidence sufficient to support a finding that the item is what the proponent claims it is." The Rule provides several examples of evidence that may satisfy the requirement, including the testimony of a witness with knowledge that the item is what it is claimed to be. Fed. R. Evid. 901(b)(1).

We are not persuaded by Petitioner that Patent Owner's exhibits lack sufficient authentication. Mr. Balassanian testifies that he was the authorized custodian of BeComm and that the exhibits are true copies of the original records and were kept in the course of regularly conducted business activity. Ex. 2001 ¶¶ 81–83. Mr. Balassanian's testimony also describes the CVS repository as tracking the dates, users, and versions of the exhibits, and recording such information in the source code files themselves and also in log files. Ex. 2001 ¶ 85–89; see also Ex. 2080 ¶ 19. Patent Owner submitted the metadata containing the log files and also metadata from the

file systems on which the exhibits were originally stored. See, e.g., Exs. 2013, 2077. We find Mr. Balassanian's testimony coupled with the metadata from the CVS repository and file system sufficient to authenticate the exhibits. We disagree that such testimony and evidence should be excluded on the basis of insufficient authentication because they stem from the inventor himself.

To the extent the analysis of whether the exhibits are sufficiently authenticated and the analysis of whether they effectively corroborate Mr. Balassanian's testimony overlap with each other, we find that the documents and their metadata do not suffer from the circular evidentiary problems argued by Petitioner. *See ATI Tech. ULC v. Iancu*, 920 F.3d 1362, 1370–71 (Fed. Cir. 2019) (relying in part on metadata from a revision-control system to corroborate inventor testimony).

2. Exhibits 2081 and 2082

The second set of documents sought to be excluded by Petitioner are Exhibits 2081 and 2082, which are claim charts attached to Patent Owner's expert declaration containing a limitation-by-limitation mapping of BeComm source code to the challenged claims. See Exs. 2081, 2082. Patent Owner relies on these charts as evidence that BeComm source code practices the claim limitations and therefore that the inventors conceived of and reduced the invention to practice prior to Janevski's priority date. PO Resp. 29–31. As indicated above, however, we find that BeComm source code, even if it practices the claim limitations, does not show that the inventors conceived of the invention. This is because

the source code files themselves indicate the source code was authored by non-inventor Mr. Carpenter, rather than the two named inventors.

Because we have not relied upon Exhibits 2081 or 2082 in this Decision, we dismiss Petitioner's Motion to Exclude as moot as it relates to these two exhibits.

III. CONCLUSION

For the foregoing reasons, we conclude Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 8, 11, and 17 of the '252 Patent are unpatentable under 35 U.S.C. § 103(a) over Janevski in combination with Azevedo, Mills, Berthaud, or Eidson but has not demonstrated by a preponderance of the evidence that the aforementioned claims are unpatentable over Janevski alone, or over Janevski combined with Baumgartner.

ORDER

For the reasons given, it is:

ORDERED that claims 1–3, 8, 11, and 17 are held to be unpatentable;

FURTHER ORDERED Petitioner's Motion to Exclude is denied-inpart with respect to Exhibits 2002–2009, 2011–2078, and 2083–2088 and dismissed-in-part as moot with respect to Exhibits 2081 and 2082; and

FURTHER ORDERED that, because this is a Final Written Decision, the 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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APPENDIX D:
Constitutional Provision Involved

U.S. Const. art. II, § 2.

Section 2. The President shall be Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States; he may require the Opinion, in writing, of the principal Officer in each of the executive Departments, upon any Subject relating to the Duties of their respective Offices, and he shall have Power to Grant Reprieves and Pardons for Offences against the United States, except in Cases of Impeachment.

He shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two thirds of the Senators present concur; and he shall nominate, and by and with the Advice and Consent of the Senate, shall appoint Ambassadors, other public Ministers and Consuls, Judges of the supreme Court, and all other Officers of the United States, whose Appointments are not herein otherwise provided for, and which shall be established by Law: but the Congress may by Law vest the Appointment of such inferior Officers, as they think proper, in the President alone, in the Courts of Law, or in the Heads of Departments.

The President shall have Power to fill up all Vacancies that may happen during the Recess of the Senate, by granting Commissions which shall expire at the End of their next Session.