

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HULU, LLC
Petitioner

v.

SOUND VIEW INNOVATIONS, LLC
Patent Owner

Case IPR2018-00017
Patent US 6,125,371

**PATENT OWNER SOUND VIEW INNOVATIONS, LLC'S
NOTICE OF APPEAL**

via PTAB E2E
Patent Trial and Appeal Board

via Priority Mail Express
Director
Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

via CM/ECF
United States Court of Appeals for the Federal Circuit

Please take notice, under 28 U.S.C. § 1295(a)(4)(A), 35 U.S.C. §§ 141(c), 142 and 319; 37 C.F.R. § 90.2(a)(1); Fed. R. App. P. 15(a); and Fed. Cir. R. 15, subsection (a) and related Practice Note, Sound View Innovations, LLC (“Patent Owner”) hereby appeals to the United States Court of Appeals for the Federal Circuit from the final written decision under 35 U.S.C. § 318(a) of a panel of the Patent Trial and Appeal Board (“Board”) entered in the above-captioned *inter partes* review of expired U.S. Patent No. 6,125,371 (“’371 Patent”) on April 9, 2019, Paper 48 (“Final Written Decision”) (Attachment 1), based on the Board’s Decision Granting Institution of *Inter Partes* Review on behalf of the Director of the United States Patent and Trademark Office (“Director”) entered on April 16, 2018, Paper 14 (“Institution Decision”) (Attachment 2).

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), this notice provides that Patent Owner’s issues on appeal may include, but are not limited to:

- (i) the Board’s determination that Petitioner Hulu, LLC (“Petitioner”) properly showed that issued claims 8–10 of the ’371 Patent are unpatentable as obvious over PHILIP A. BERNSTEIN ET AL., CONCURRENCY CONTROL AND RECOVERY IN DATABASE SYSTEMS (1987) (“Bernstein”), alone or in combination with U.S. Patent No. 5,155,842 (“Rubin”);

- (ii) whether *inter partes* review is unconstitutional as applied to Appellant and the '371 patent because the enactment of the inter partes review statutes (in the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), codified in 35 U.S. Code Chapter 31) retroactively impaired the vested rights in the '371 patent, which rights vested when the '371 patent issued in 2000;
- (iii) whether the unpatentability determinations in this case by a panel of Patent Trial and Appeals Board (“PTAB”) members are unconstitutional as applied to the '371 patent because the PTAB members, in rendering determinations in this *inter partes* review adverse to the vested rights in the '371 patent, acted as Principal Officers under the Appointments Clause of the United States Constitution, despite having been appointed by the Secretary of the Department of Commerce under 35 U.S.C. § 6(a), Pub. L. 110-313, § 1(a), Aug. 12, 2008, 122 Stat. 3014, rather than nominated by the President by and with the advice and consent of the Senate;
- (iv) any further findings or determinations by the Director or the Board supporting or relating to the issues above; and

- (v) all other issues decided adversely to Patent Owner or the '371 Patent in any orders, decisions, rulings, or opinions, whether written or oral, of the Board, on its own or on another's behalf, in this proceeding.

In accordance with Fed. Cir. R. 15, and related Practice Note, Patent Owner attaches to this Notice of Appeal copies of the decisions from which review is sought. Concurrently with the present submission, Patent Owner is filing a copy of this Notice of Appeal with the Director, and a copy of the same along with the required docketing fee with the Clerk of the United States Court of Appeals for the Federal Circuit.

Respectfully submitted,

_____/ Kenneth J. Weatherwax /_____

Date: May 10, 2019

Kenneth J. Weatherwax, Reg. No. 54,528
LOWENSTEIN & WEATHERWAX LLP

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served by electronic service, by agreement between the parties, on the date signed below:

**PATENT OWNER SOUND VIEW INNOVATIONS, LLC'S
NOTICE OF APPEAL**

The names and address of the parties being served are as follows:

David L. Cavanaugh (david.cavanaugh@wilmerhale.com)
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Respectfully submitted,

/ Jason Linger /

Date: May 10, 2019

CERTIFICATE OF FILING WITH USPTO

The undersigned hereby certifies that, pursuant to 37 C.F.R. § 90.2(a), two copies of the following document were filed by Priority Mail Express or equivalent service with the Director of the United States Patent and Trademark Office via the Office of the General Counsel, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, Virginia 22313-1450, on the date signed below:

**PATENT OWNER SOUND VIEW INNOVATIONS, LLC'S
NOTICE OF APPEAL**

Respectfully submitted,

/ Jason Linger /

Date: May 10, 2019

CERTIFICATE OF FILING WITH COURT OF APPEALS

The undersigned hereby certifies that, pursuant to 37 C.F.R. § 90.2, Fed. R. App. Proc. 15(a)(1), Fed. Cir. R. 15(a)(1) & 52, and Manual of Patent Examining Procedure 1216.01, the following document was electronically filed in Portable Document Format (PDF) with the United States Court of Appeals for the Federal Circuit, via electronic CM/ECF, and a paper copy was sent to the Clerk of the Federal Circuit at the U.S. Court of Appeals for the Federal Circuit, 717 Madison Place, N.W., Washington, DC 20439, accompanied by the requisite fee paid on pay.gov, on the date signed below:

**PATENT OWNER SOUND VIEW INNOVATIONS, LLC'S
NOTICE OF APPEAL**

Respectfully submitted,

/ Jason Linger /

Date: May 10, 2019

Attachment 1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HULU, LLC,
Petitioner,

v.

SOUND VIEW INNOVATIONS, LLC,
Patent Owner.

Case IPR2018-00017
Patent 6,125,371

Before DEBRA K. STEPHENS, DANIEL J. GALLIGAN, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

GALLIGAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, Hulu, LLC (“Petitioner”) challenges the patentability of claims 8–10 of U.S. Patent No. 6,125,371 (Ex. 1101, “the ’371 patent”), which is assigned to Sound View Innovations, LLC (“Patent Owner”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that claims 8–10 of the ’371 patent are unpatentable. *See* 35 U.S.C. § 316(e) (“In an *inter partes* review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.”).

A. Procedural History

On October 5, 2017, Petitioner filed a Petition (Paper 5 (“Pet.”)) requesting *inter partes* review of claims 8–10 of the ’371 patent, alleging obviousness under 35 U.S.C. 103(a)¹ over the combined teachings of Bernstein² and Rubin.³ Together with the Petition, Petitioner filed a Motion

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the challenged claims of the ’371 patent have an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

² PHILIP A. BERNSTEIN ET AL., CONCURRENCY CONTROL AND RECOVERY IN DATABASE SYSTEMS (1987). The full textbook (“the Bernstein textbook”) is located in Exhibit 1109. Exhibit 1103 (“Bernstein”) contains particular excerpts.

³ U.S. Patent No. 5,155,842, issued Oct. 13, 1992 (Ex. 1104).

for District Court-Type Claim Construction as well as a Motion for Joinder, seeking to join IPR2017-00985. Paper 3; Paper 4. On January 25, 2018, during the pendency of Petitioner’s Motion for Joinder, IPR2017-00985 was terminated. IPR2017-00985, Paper 41. We, therefore, dismissed as moot the Motion for Joinder. Paper 13. Patent Owner filed a Preliminary Response. Paper 11. On April 16, 2018, we instituted trial as to all challenged claims (claims 8–10) on the ground of unpatentability raised in the Petition—obviousness over the combination of Bernstein and Rubin—and we granted Petitioner’s Motion for District Court-Type Claim Construction. Paper 14 (“Dec. on Inst.”), 28–29.

During the trial, Patent Owner filed a Response (Paper 21, “PO Resp.”), and Petitioner filed a Reply (Paper 31, “Pet. Reply”). With our authorization (Paper 32), Patent Owner filed a Sur-Reply (Paper 40, “PO Sur-Reply”).

An oral hearing was held on December 18, 2018, a transcript of which appears in the record. Paper 47 (“Tr.”).

B. Real Parties in Interest

Petitioner states: “Hulu, LLC, is the real party-in-interest. The following entities own ten percent or more of the stock of Petitioner, and may also be considered real parties-in-interest: The Walt Disney Company, 21st Century Fox, Comcast Corporation, and Time Warner Inc.” Pet. 1. In Updated Mandatory Notices, Petitioner states the following: “Petitioner, Hulu, LLC, is and remains the real party-in-interest. The following entities own ten percent or more of the stock of Hulu, LLC: AT&T, Inc., Comcast Corporation, Twenty-First Century Fox, Inc., and The Walt Disney Company. None of the foregoing parties listed as part-owners of Hulu, LLC

controlled or funded this *inter partes* review proceeding (IPR), nor did they contribute to the preparation of this IPR in any way.” Paper 28, 1.

As real parties in interest, Patent Owner identifies itself and Sound View Innovation Holdings, LLC. Paper 10, 1.

In its Response, Patent Owner notes that the Court of Appeals for the Federal Circuit issued a decision regarding the issue of real parties in interest in *inter partes* reviews. PO Resp. 60. Patent Owner states the following: “That decision is still sealed. For avoidance of doubt, Patent Owner reserves all its rights to address these issues in light of the new decision when it is made public.” *Id.* Patent Owner did not raise this issue in its Sur-Reply, nor did it request additional briefing to address this issue. Therefore, no real party in interest issue is before us.

C. Related Matters

As required by 37 C.F.R. § 42.8(b)(2), the parties identify various district court litigations involving the ’371 patent. Pet. 1–2; Paper 10, 1–2. The ’371 patent was at issue in IPR2017-00985, which we terminated, as discussed above. The ’371 patent is also at issue in IPR2018-00096 and IPR2018-00366, in which we issue final written decisions concurrently with this Decision.

D. The ’371 Patent

The ’371 patent, titled “System and Method for Aging Versions of Data in a Main Memory Database,” generally describes systems and methods for managing versions of data records in a database to increase data capacity. Ex. 1101, [57], 2:55–62. The Background of the Invention section of the ’371 patent explains that “[d]atabase systems typically include a database manager (‘DBM’) and a database (i.e., a data repository).” *Id.* at

Figure 1 depicts a flow diagram of an exemplary method for controlling multi-versioned data records. Ex. 1101, 3:36–38. The '371 patent explains the following:

Version manager 100 may be software-based and executable by any suitably arranged processing system 105 (e.g., a computer, communications switch, etc.). Version manager 100 includes three controllers, namely, a time stamping controller 110, a versioning controller 115 and an aging controller 120. Those skilled in the art should be familiar with the use of controllers in processing environments generally and, more specifically, with main memory databases. Controllers may be implemented in software, firmware, hardware, or some suitable combination of at least two of the three.

Ex. 1101, 4:47–57. Time stamping controller 110 receives update and read-only transactions for main memory database 125, step 130. *Id.* at 4:58–60. “In response, time stamping controller 110 assigns a time stamp to each received transaction, step 140.” *Id.* at 4:62–64. “[V]ersioning controller 115 determines whether a given transaction is an update transaction, decisional step 150.” *Id.* at 5:5–7.

If the transaction is an update transaction, . . . versioning controller 115 (1) obtains a “X” lock on one or more data records to be modified (or otherwise changed), step 155, (2) modifies a copy of the most recent “past” version of the data record in response to the update transaction, creating a new “current” or “successor” version, step 165 and (3) commits the transaction, at which time it increments time stamp counter 145, assigns a time stamp therefrom to the new “successor” versions of the updated data records and releases the “X” lock held by the update transaction, step 170.

Ex. 1101, 5:7–18. Aging controller 120 “monitors main memory database 125 to (1) continuously order (e.g., sort, arrange, etc.) multiple versions of ones of the data records according to their associated time

stamps, step 180 and (2) monitor one or more measurable characteristics describing, relating to, or otherwise associated with a utilization or capacity of main memory 135, step 185.” *Id.* at 5:36–44. Aging controller 120 also deletes earlier versions of data records in response to the time stamp associated with those versions and at least one measurable main memory characteristic, step 190. *Id.* at 5:44–48.

E. Challenged Claims

Challenged claims 8–10 are reproduced below.

8. A method of operating a processing system for use with a database of data records, said database stored in a memory, comprising the steps of:

assigning a time stamp to transactions to be performed on said database;

creating multiple versions of ones of said data records affected by said transactions that are update transactions;

monitoring a measurable characteristic of said memory; and

deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.

9. The method as recited in claim 8 wherein said time stamp is generated as a function of a time stamp counter.

10. The method as recited in claim 9 further comprising the step of incrementing said time stamp counter.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Citing the testimony of its declarant, Dr. Phillip Gibbons, Petitioner argues “[a] person of ordinary skill in the art would have possessed at least a bachelor’s degree in electrical engineering or computer science (or

equivalent degree or experience) with at least two years of experience in the design and/or development of database and record management systems.” Pet. 5 n.1 (citing Ex. 1102 ¶ 11). Patent Owner does not provide a different assessment in the Patent Owner Response, but Patent Owner’s declarant, Dr. Mark Jones, provides the following testimony on this issue:

I generally agree with the level of ordinary skill described by Gibbons, except that at the time of the invention, a person of ordinary skill in the art would not have been able to devise algorithms or conduct original design or development of new database systems. Rather, a person of ordinary skill would have been able to implement database management software, such as multi-version concurrency control, based on algorithms and designs already provided to them. As will be discussed in more detail in connection with particular arguments, designing software such as multi-version concurrency control contains theoretical aspects (such as proof of correctness) and inventive aspects (such as practical garbage collection) that were beyond the abilities of the person of ordinary skill.

Ex. 2012 ¶ 21.

Thus, Dr. Jones does not disagree with Petitioner and Dr. Gibbons’s assessment but, rather, offers additional exceptions and qualifications, which we address in our analysis below. Because there is general agreement among the parties that Petitioner and Dr. Gibbons’s assessment of the level of ordinary skill is correct, we adopt Petitioner’s statement of the level of ordinary skill in the art with the exception of the language “at least,” which introduces ambiguity. Thus, we determine that a person of ordinary skill in the art would have had a bachelor’s degree in electrical engineering or computer science (or equivalent degree or experience) with two years of experience in the design and/or development of database and record management systems.

B. Claim Interpretation

As noted above, we granted Petitioner’s Motion for District Court-Type Claim Construction because the ’371 patent expired on August 19, 2017. Dec. on Inst. 7, 28. In applying the district court-type claim construction standard, we are guided by the principle that the words of a claim “are generally given their ordinary and customary meaning,” as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (citation omitted). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). There is a “heavy presumption,” however, that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

Based on the record developed during trial, we address the interpretation of “measurable characteristic of said memory.”

1. “[M]easurable characteristic of said memory”

Claim 8 recites “monitoring a measurable characteristic of said memory.” Patent Owner argues that monitoring “logical events” does not teach monitoring a measurable characteristic of memory because “a measurable memory characteristic is a quantitative assessment, such as the percentage utilization of memory, e.g., 51%.” PO Resp. 7. Patent Owner further argues that “determining whether ‘memory is full’ does not necessarily entail monitoring a measurable characteristic” and that

“‘memory is full’ is a logical determination, not a measurable characteristic.” *Id.* at 48–49. According to Patent Owner, “[l]ogical events are *qualitative* assessments with a true/false outcome, such as whether a print job is completed, or whether there is disk error, or whether disk is full. In contrast, ‘measurable characteristics’ are *quantitative* assessments—hence, measurable.” *Id.* at 51 (citing Ex. 2012 ¶ 85). Patent Owner further argues that “‘disk full’ or ‘disk approaching threshold full’ logical events do not disclose the claims because they are logical events, which are immeasurable qualitative assessments.” *Id.* at 52 (citing Ex. 1104, 1:64–66, 6:23–24). Petitioner argues Patent Owner’s interpretation is unduly narrow. Pet. Reply 19–24. We agree with Petitioner.

Patent Owner’s interpretation of “measurable characteristic” is refuted by the specification of the ’371 patent, which states that

aging controller 120 determines a current value of L in response to one or more *measurable main memory characteristics*, step 200, *such as a current utilization or capacity of main memory*, a trend analysis of a utilization or capacity of main memory over a time period (t), or any other applied mathematics- or statistics-based analysis, *including a comparison of any of the same with a threshold, ceiling/floor, limit, set point or the like.*

Ex. 1101, 6:46–53 (emphases added). According to the ’371 patent, therefore, a comparison of a memory’s current utilization or capacity to a threshold is within the scope of a “measurable main memory characteristic[.]” Thus, Patent Owner’s attempt to distinguish “logical events” and “qualitative assessments” from measurable characteristics of memory is contrary to the specification.

We determine that the phrase “measurable characteristic of said memory” does not require further construction.⁴

2. *Remaining Terms*

In the Decision on Institution, we adopted Petitioner’s proposed constructions for the terms “update transactions” and “data record.” Dec. on Inst. 8–9. The interpretation of these terms is not in dispute, and these constructions are not necessary to resolve the disputes at issue. Based on the record before us, we determine that these terms and the remaining terms of the claims at issue do not require express constructions. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e 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))).

C. *Principles of Law*

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;

⁴ In related litigation, the U.S. District Court for the Central District of California determined that this phrase did not require construction. IPR2018-00096, Ex. 1030, 13 (entered as Ex. 3002 in this proceeding).

(3) the level of ordinary skill in the art; and (4) any secondary considerations, if in evidence.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

*D. Obviousness over Bernstein and Rubin
(Claims 8–10)*

Petitioner contends claims 8–10 of the '371 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bernstein and Rubin. Pet. 3, 13–33.

1. Overview of Bernstein (Ex. 1103)

Exhibit 1103 contains excerpts from a textbook on database systems, titled *Concurrency Control and Recovery in Database Systems*. Petitioner asserts that “Bernstein qualifies as prior art to the claims of the '371 patent under 35 U.S.C. § 102(b) (pre-AIA).” Pet. 7. Petitioner introduces additional evidence that the Bernstein textbook was published more than one year before the August 19, 1997, filing date of the '371 patent. *See* Exs. 1106 (Bernstein textbook excerpts, including title page and date stamp (April 27, 1987) from Library of Congress), 1107 (Bernstein textbook excerpts, including stamp from the University of Michigan Libraries and date annotation (1987)). During the trial, Patent Owner did not contest the status of Bernstein as a prior art printed publication under 35 U.S.C. § 102(b). Based on the evidence of record, we determine Bernstein is a prior art printed publication under 35 U.S.C. § 102(b).

⁵ Patent Owner has not presented evidence of secondary considerations as to any of the challenged claims.

Bernstein explains that “[a] *database* consists of a set of named *data items*.” Ex. 1103, 2.⁶ “Each data item has a *value*.” *Id.* “A *database system (DBS)* is a collection of hardware and software modules that support commands to access the database, called *database operations* (or simply *operations*).” *Id.* (footnote omitted). For example, a “Read(*x*)” operation “returns the value stored in data item *x*,” and a “Write(*x*, *val*)” operation “changes the value of *x* to *val*.” *Id.*

Bernstein teaches a number of techniques for addressing concurrent access problems. *Id.* at 1. In particular, Bernstein explains that “[w]hen two or more transactions execute concurrently, their database operations execute in an *interleaved* fashion. That is, operations from one program may execute in between two operations from another program. This interleaving can cause programs to behave incorrectly, or *interfere*, thereby leading to an inconsistent database.” *Id.* at 11. One of the techniques described in Bernstein to provide concurrency control is referred to as “multiversion concurrency control.” *Id.* at 143. “In a multiversion concurrency control algorithm, each Write on a data item *x* produces a new copy (or *version*) of *x*.” *Id.*

“The benefit of multiple versions for concurrency control is to help the scheduler avoid rejecting operations that arrive too late.” Ex. 1103, 143. Bernstein explains that, with multiversion concurrency control, “each transaction has a unique timestamp” and that “[e]ach operation carries the timestamp of its corresponding transaction.” *Id.* at 153; *see also id.* at 5 (“transactions that write into the database (called *update transactions* or

⁶ Our citations are to the page numbers of the Bernstein reference itself, rather than to the page numbers of Exhibit 1103.

updaters)”). For example, as noted above, each Write operation produces a new copy or version of *x* (*id.* at 143), and the new version is “labeled by the timestamp of the transaction that wrote it.” *Id.* at 153.

Bernstein acknowledges that “[a]n obvious cost of maintaining multiple versions is storage space. To control this storage requirement, versions must periodically be purged or archived.” *Id.* at 143–44. Bernstein explains that versions may be purged or archived when the system has run out of storage space. In particular, Bernstein discloses the following:

Eventually, the scheduler will run out of space for storing intervals, or the [data manager] will run out of space for storing versions. At this point, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Id. at 154.

2. *Overview of Rubin (Ex. 1104)*

Rubin, titled “Logical Event Notification Method and Apparatus,” discloses a technique for monitoring devices and programs in a computer network for certain events (such as running out of storage space) and notifying other programs that those events have occurred. Ex. 1104, at [54], [57], 1:67–2:2. Rubin’s Figure 1 is reproduced below.

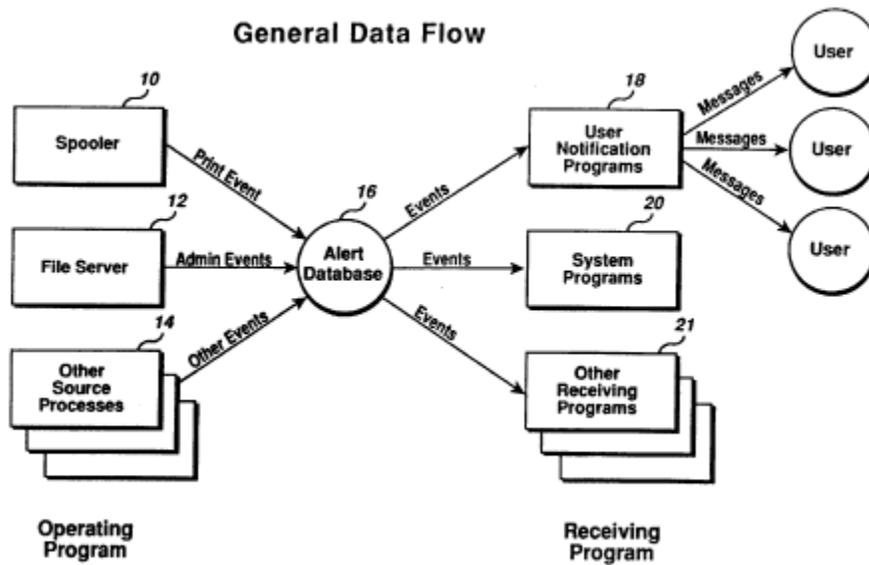


Figure 1

Figure 1, reproduced above, depicts “a schematic of a logical event notification flow from an operating program, through the alert database to a receiving program.” *Id.* at 2:66–68. Operating programs 10, 12, and 14 perform functions for controlling devices or are controlled by devices or the network. *Id.* at 3:10–12. “The operating program is the source of the event; it may be referred to as the source program. As programs operate on the network, logical events occur.” *Id.* at 3:12–15; *see also id.* at 4:64–65 (“Any program operating on the network may become a source program.”).

Rubin teaches a variety of logical events that may be produced by source programs. Ex. 1104, 2:51–53 (“A further advantage of the invention is that the event triggering the notification in the operating program is software defined.”). In particular, Rubin teaches that the logical events may include “disk events, such as, ‘disk full,’ ‘disk approaching a threshold full level,’ ‘disk error,’ ‘failure in reading disk,’ ‘failure to write data to disk,’ or the like.” *Id.* at 6:43–49. Once the operating program detects a logical event, it invokes alert database 16. *Id.* at 3:15–24. Alert database 16

maintains a record of which programs receive notification of the event, i.e., receiving programs 18, 20, and 21. *Id.* at 3:25–36. While receiving programs 18 and 20 notify a user (*id.* at 3:38–41) or a system administrator (*id.* at 3:54–56) of the occurrence of an event, other receiving programs 21 perform other functions. For example, “[o]ther receiving programs 21 may store the event or take action based on the event type.” *Id.* at 3:56–58. That action can include automatically deleting older programs when Rubin’s system determines that the data stored on the disk has reached, exceeds, or is approaching a threshold amount, as disclosed in the following excerpt from Rubin:

In one embodiment of the invention, the system administrator is automatically alerted whenever the quantity of data on the disk exceeds a threshold amount. The administrator may then take action to conserve disk space or delete programs. *The program may automatically delete the oldest versions of some programs to obtain more disk space.* The program may send mail to users using significant disk space and ask them to clean-up [] their databases and remove unnecessary data.

Id. at 5:24–32 (emphasis added).

3. Independent Claim 8

Claim 8 is directed to “[a] method of operating a processing system for use with a database of data records, said database stored in a memory.” Petitioner argues Bernstein teaches such a method. Pet. 13–15 (citing Ex. 1103, 2, 17; Ex. 1102 ¶ 44). Bernstein explains that “[a] *database* consists of a set of named *data items*.” Ex. 1103, 2. Bernstein describes a database system (DBS) as “a collection of hardware and software modules that support commands to access the database” and further discloses that “the DBS executes on a *centralized* computer system.” Ex. 1103, 2, 17. We find that Bernstein teaches the preamble of claim 8.

a. Assigning a time stamp

Claim 8 recites “assigning a time stamp to transactions to be performed on said database.” Bernstein discloses that, “[a]s for all [timestamp ordering (‘TO’)] schedulers, each transaction has a unique timestamp, denoted $ts(T_i)$. Each operation carries the timestamp of its corresponding transaction. Each version is labeled by the timestamp of the transaction that wrote it.” Ex. 1103, 153, *quoted in* Pet. 16; *see* Ex. 1102 ¶ 45. Based on this evidence, we find that Bernstein teaches this limitation of claim 8.

b. Creating multiple versions of data records

Claim 8 further recites “creating multiple versions of ones of said data records affected by said transactions that are update transactions.”

According to Petitioner, Bernstein teaches that, “when a ‘**Write**’ operation is to be performed on an item in the database, the software generates a new version of the item.” Pet. 19 (citing Ex. 1103, 143). In particular, Bernstein discloses that, “[i]n a multiversion concurrency control algorithm, each Write on a data item x produces a new copy (or *version*) of x . The [data manager (‘DM’)] that manages x therefore keeps a list of versions of x , which is the history of values that the DM has assigned to x .” Ex. 1103, 143. As discussed above, Bernstein discloses that the operation “Write(x, val) changes the value of x to val .” *Id.* at 2, *quoted in* Pet. 20; *see* Ex. 1102 ¶¶ 48, 49. Although these passages of Bernstein refer to an “operation,” rather than a “transaction,” we credit the testimony of Petitioner’s declarant that this difference is immaterial. Ex. 1102 ¶ 50; *see* Ex. 1103, 2 (referring to “*database operations* (or simply *operations*)”), 5 (referring to “transactions that write into the database” as “*update*

transactions or updaters”). Based on this evidence, we find that Bernstein teaches this limitation of claim 8.

c. Monitoring a measurable characteristic

Claim 8 further recites “monitoring a measurable characteristic of said memory.” Petitioner argues that Bernstein alone renders obvious this subject matter and also that Rubin, in combination with Bernstein, teaches this limitation. Pet. 20–29. We address each of these contentions in turn.

i. Bernstein alone

In its contentions as to this limitation, Petitioner relies on the following passage of Bernstein:

Eventually, the scheduler will run out of space for storing intervals, or the DM will run out of space for storing versions. At this point, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Ex. 1103, 154, *quoted in* Pet. 21. Petitioner argues:

Although the passage from Bernstein above does not expressly state that the system “**monitor[s] a measurable characteristic of said memory**,” it would have been obvious to a person of ordinary skill in the art that the disclosures in Bernstein disclose this step. ([Ex. 1102] ¶ 52.) Bernstein explains that “[a]n obvious cost of maintaining multiple versions is storage space. To control this storage requirement, versions must be periodically purged or archived.” ([Ex. 1103,] 143–44.) To this end, the passage quoted above indicates that Bernstein can detect when it has “**run out of space**” for storing intervals or data items, and can respond to that condition by deleting older versions. (*Id.*, p.154.) Therefore, it would have been obvious that this functionality discloses the ability to ascertain the amount of available space for storing items, *i.e.*, monitoring a measurable characteristic of the system’s memory. ([Ex. 1102] ¶ 52.) Otherwise, the system could not determine when it has run out

of space. (*Id.*) Moreover, determining the amount of free space or memory was a standard and well-known feature. (*Id.*)

Pet. 21–22; *see* Ex. 1102 ¶ 52.

Patent Owner argues Bernstein does not teach monitoring a measurable characteristic of memory “because, *first*, determining whether ‘memory is full’ does not necessarily entail monitoring a measurable characteristic, and, *second*, ‘memory is full’ is a logical determination, not a measurable characteristic.” PO Resp. 48–49. As discussed above in the section addressing claim interpretation, the ’371 patent provides examples of “measurable main memory characteristics,” including

a current utilization or capacity of main memory, a trend analysis of a utilization or capacity of main memory over a time period (t), or any other applied mathematics- or statistics-based analysis, including a comparison of any of the same with a threshold, ceiling/floor, limit, set point or the like.

Ex. 1101, 6:47–53 (emphasis added). A determination that memory is full is a determination as to the current utilization of the memory. Thus, whether or not it is a “logical determination,” as Patent Owner argues in its second point, is irrelevant because such a determination is still within the scope of a measurable characteristic according to the specification of the ’371 patent.

In support of its first reason, Patent Owner argues “[t]here are numerous ways to determine when the system has ‘run out of memory’ that have nothing to do with monitoring a measurable characteristic,” including that “the system could respond to error codes when writes are repeatedly failing, or when a request to the operating system to allocate memory for additional copies or intervals is rejected.” PO Resp. 49. In support of this contention, Patent Owner and Dr. Jones cite deposition testimony about a “malloc” command from IPR2018-00096, specifically testimony of Dr. Paul

Franzon, whose declaration testimony was submitted by the petitioner in IPR2018-00096. PO Resp. 49 (citing Ex. 2014, 134:6–14); Ex. 2012 ¶ 79. In addition, Dr. Jones provides testimony regarding the malloc command, noting that “[i]t is a means of allocating memory of a particular size at a particular time” but explaining that “[i]t does not indicate that memory of other sizes is not available nor does it indicate that memory will not become available later (*e.g.*, when memory is freed).” Ex. 2012 ¶ 80.

Patent Owner’s arguments about responding to error codes and the cited testimony of Dr. Jones and Dr. Franzon about the malloc command ignore Bernstein’s express disclosure. Bernstein does not state that, eventually, there will be errors in allocating memory, which could result from less space being available than requested. Rather, Bernstein states that, “[e]ventually, the scheduler will *run out of space* for storing intervals, or the DM will *run out of space* for storing versions. At this point, old versions and their corresponding intervals must be deleted.” Ex. 1103, 154 (emphases added). Bernstein, therefore, discloses “run[ning] out of space” (*id.*), which teaches a measure of the “current utilization” of memory—i.e., fully utilized. *See* Ex. 1101, 6:48. And Bernstein’s disclosure that versions “must be deleted” upon “run[ning] out of space” teaches *monitoring* a measurable characteristic of the memory by determining that space in memory has “run out” such that a particular action (deleting versions) is taken in response.

Based on the evidence before us, we find Bernstein teaches “monitoring a measurable characteristic of said memory” according to the specification of the ’371 patent, which identifies “current utilization” of

memory as a “measurable main memory characteristic[.]” Ex. 1101, 6:47–53.

ii. Bernstein and Rubin

In addition, Petitioner relies on Rubin in combination with Bernstein for the “monitoring a measurable characteristic” limitation, arguing the following:

The Petitioner acknowledges that Bernstein does not explain how, from a technical standpoint, the system in Bernstein determines that it has “run out of space” for storing intervals or versions. It is possible that the patent owner might take a narrow position on the “monitoring” limitation in order to assert that Bernstein alone does not sufficiently disclose the claimed “monitoring” feature, or could argue for a different interpretation of the teachings of Bernstein. For this reason, this Petition also cites to the **Rubin** reference. Rubin clearly and explicitly discloses the claimed monitoring feature and, as explained above, is readily combinable with the database system in Bernstein.

Pet. 22–23.

Petitioner relies on Rubin’s disclosure of “monitoring logical events on a network and notifying programs desiring information on specified types of events.” Ex. 1104, 1:68–2:2, *quoted in* Pet. 23. Rubin discloses that these logical events can include “disk events, such as, ‘disk full,’ ‘disk approaching a threshold full level,’ ‘disk error,’ ‘failure in reading disk,’ ‘failure to write data to disk,’ or the like.” Ex. 1104, 6:43–46, *quoted in* Pet. 23. Further, Rubin discloses that “the system administrator is automatically alerted whenever *the quantity of data on the disk* exceeds a threshold amount.” Ex. 1104, 5:24–26 (emphasis added), *quoted in* Pet. 24.

Patent Owner argues “Rubin discloses monitoring only of ‘logical events,’ and ‘logical events’ are not ‘measurable characteristics’ of

memory.” PO Resp. 50 (citing Ex. 2012 ¶ 82); *see generally* PO Resp. 49–56. As discussed above in the section addressing claim interpretation, Patent Owner’s attempt to distinguish “logical events” and “qualitative assessments” from measurable characteristics of memory is contrary to the specification of the ’371 patent. Indeed, Rubin’s disclosure of providing an alert “whenever the quantity of data on the disk exceeds a threshold amount” (Ex. 1104, 5:24–26) teaches a comparison of current utilization of memory “with a threshold,” which the ’371 patent expressly states is a “measurable main memory characteristic[.]” As noted above, the ’371 patent provides examples of “measurable main memory characteristics,” including

a current utilization or capacity of main memory, a trend analysis of a utilization or capacity of main memory over a time period (t), or any other applied mathematics- or statistics-based analysis, including a comparison of any of the same with a threshold, ceiling/floor, limit, set point or the like.

Ex. 1101, 6:47–53 (emphases added). Therefore, we disagree with Patent Owner’s contentions that Rubin’s disclosures are distinguishable from “monitoring a measurable characteristic of said memory.”

Based on the evidence before us, we find Rubin alone, or taken in combination with the disclosures of Bernstein discussed above in our analysis of this limitation, teaches “monitoring a measurable characteristic of said memory” according to the specification of the ’371 patent, which identifies “current utilization” of memory and “a comparison of any of the same [i.e., current utilization] with a threshold” as a “measurable main memory characteristic[.]” Ex. 1101, 6:47–53.

d. Deleting versions

The final limitation of claim 8 recites “deleting ones of said multiple versions of said ones of said data records in response to said time stamp and

said measurable characteristic thereby to increase a capacity of said memory.” Petitioner argues that Bernstein teaches deleting old versions of data items and their corresponding intervals to recover storage space. Pet. 29–30 (citing Ex. 1103, 143, 154). Further, because the deletions are based on the age of the version, as well as the storage space available, Petitioner argues Bernstein taken alone or in combination with Rubin teaches that such deletions are “in response to said time stamp and said measurable characteristic.” Pet. 30–31 (citing Ex. 1103, 154; Ex. 1104, 5:24–32); *see* Ex. 1102 ¶¶ 54–56; *see also* Ex. 1103, 153 (“largest,” i.e., latest, time stamp), 161 (“smallest,” i.e., earliest time stamp). As noted by Petitioner, Bernstein discloses that “[t]o avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.” Ex. 1103, 154, *quoted in* Pet. 30. As further noted by Petitioner, Bernstein discloses that, “[s]ince timestamps increase monotonically with time and are unique, if a transaction lives long enough it will eventually have the smallest timestamp (i.e., will be the oldest) in the system.” Ex. 1103, 85–86, *quoted in* Pet. 31. Moreover, Petitioner argues that these deletions “increase a capacity of said memory.” Pet. 31–32 (citing Ex. 1103, 154, 161; Ex. 1104, 5:28–30); *see* Ex. 1102 ¶ 57. In addition to its arguments relying on Bernstein alone, Petitioner also argues this limitation of claim 8 would have been “obvious in view of Rubin because, as explained above, Rubin discloses automatically deleting old data in response to ‘disk full’ or ‘disk approaching a threshold full level’ events.” Pet. 30 (citing Ex. 1104, 5:24–32).

According to Patent Owner, “[i]dentifying which versions can be deleted and recovering the space associated with them” is “a concept known as ‘garbage collection.’” PO Resp. 22 (citing Ex. 2013, 50:14–25; Ex. 2014,

88:20–89:11). The “deleting” step of claim 8 is allegedly directed to such “garbage collection.” *See id.* at 56. Patent Owner argues

Bernstein does not disclose any garbage collection algorithm for its [multiversion timestamp ordering (MVTO)] method, and the [person of ordinary skill in the art] would not have found it obvious or reasonably feasible to combine Bernstein’s MVTO method and Rubin to design a practical garbage collection algorithm practicing the Claims.

PO Resp. 21 (citing Ex. 2012 ¶¶ 39–40). Patent Owner further asserts the following:

Petitioners’ conclusory assertion that the “in response to” limitation of the Claim is disclosed by Bernstein’s statement that “old versions” must be deleted because memory “will eventually run out of space,” IPR2018-00017 Pet. at 30; IPR2018-00096 Pet. at 32-33, is nonsensical. It is based on a superficial, hindsight reading of Bernstein that is divorced from realities that the [person of ordinary skill in the art] would have understood at the time. Bernstein’s disclosure relied upon by the Petition is not stating that old versions must be deleted *in response to* memory running out of space; rather, Bernstein only states that old versions should be deleted *because* memory will “eventually” run out. Bernstein is stating a need for garbage collection but, for MVTO, is not providing a *solution* for that need. Without a practical means for garbage collection, a multi-versioning method for database systems is not useful or practical.

PO Resp. 26–27 (citing Ex. 2012 ¶¶ 48–49).

Patent Owner’s argument ignores the express disclosure of Bernstein. Bernstein does not state, and Petitioner does not allege that Bernstein states, “that ‘old versions’ must be deleted because memory ‘will eventually run out of space.’” *See* PO Resp. 26. Bernstein discloses the following:

Eventually, the scheduler will run out of space for storing intervals, or the DM will run out of space for storing versions. *At this point*, old versions and their corresponding intervals must

be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Ex. 1103, 154 (emphasis added). Petitioner asserts “Bernstein discloses that the deletion of items occurs at [sic] when Bernstein has ‘run out of space.’” Pet. 30 (citing Ex. 1103, 154). We agree with Petitioner because Bernstein says “[a]t this point,” i.e., at the point that the scheduler has “run out of space for storing intervals” or the data manager has “run out of space for storing versions,” “old versions and their corresponding intervals must be deleted.” Ex. 1103, 154. We, therefore, disagree with Patent Owner’s statement that “Bernstein’s disclosure relied upon by the Petition is not stating that old versions must be deleted *in response to* memory running out of space” (PO Resp. 26–27) because it is contrary to the express disclosure of Bernstein cited by Petitioner.

Patent Owner also argues Bernstein does not teach deleting “in response to said time stamp.” PO Resp. 56–58. In particular, Patent Owner argues Bernstein “does not state that in MVTO, the method would determine the oldest version to delete by performing any operation on, or relating to, the time stamp.” *Id.* at 58.

We disagree. In describing MVTO, Bernstein discloses that, “[a]s for all TO schedulers, each transaction has a unique timestamp, denoted $ts(T_i)$. Each operation carries the timestamp of its corresponding transaction. Each version is labeled by the timestamp of the transaction that wrote it.” Ex. 1103, 153. Bernstein further describes timestamps as follows: “Since timestamps increase monotonically with time and are unique, if a transaction lives long enough it will eventually have the smallest timestamp (i.e., will be the oldest) in the system.” Ex. 1103, 85–86. Thus, when Bernstein states that, “[t]o avoid incorrect behavior, it is essential that versions be deleted

from oldest to newest” (Ex. 1103, 154), it is clear that the oldest version is determined based on the timestamp, i.e., the oldest version is the version with the smallest timestamp.

Patent Owner also argues that,

even if the combined teachings of Bernstein and Rubin disclosed deleting ones of said multiple versions of said ones of said data records in response to said time stamp, or performing such deleting in response to said measurable characteristic of memory, it does not disclose performing such deleting in response to *both* of these things as the claims require.

PO Resp. 58.

We disagree. Bernstein discloses that “the scheduler will run out of space for storing intervals, or the DM will run out of space for storing versions” and that “[a]t this point, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.” Ex. 1103, 154. Thus, Bernstein teaches deleting versions in response to space running out and also in response to the timestamp, which determines which version is the oldest. *See* Ex. 1103, 85–86 (disclosing that, “if a transaction lives long enough it will eventually have the smallest timestamp (i.e., will be the oldest) in the system”).

Based on the evidence before us, we find Bernstein teaches “deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic.” Furthermore, we find that the deletions in Bernstein “increase a capacity of said memory.”

Ex. 1102 ¶ 57.

We also are persuaded by Petitioner’s contention that the combination of Bernstein and Rubin teaches “deleting ones of said multiple versions of

said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.” See Pet. 30. In particular, Petitioner relies on Rubin’s teaching of providing an alert automatically “whenever the quantity of data on the disk exceeds a threshold amount” and also “automatically delet[ing] the oldest versions of some programs to obtain more disk space.” Ex. 1104, 5:24–30, *cited in* Pet. 30. Thus, we find Rubin teaches deleting data in response to a measurable characteristic of memory, which we discuss above for the “monitoring a measurable characteristic” limitation, and we find that this teaching in combination with Bernstein’s disclosures regarding deleting old versions teaches “deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.”

e. Rationale to combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Bernstein and Rubin. Pet. 25–29; see Ex. 1102 ¶¶ 64–70. In particular, as noted above, Bernstein teaches deleting older versions only *after* the scheduler or the data manager has run out of storage space. Ex. 1103, 154; see also Pet. 26–27; see Ex. 1102 ¶¶ 68–70. Petitioner notes that this “may require that the entire database system be suspended until the deletion process frees up the needed space.” Pet. 27. Petitioner argues that Rubin’s teachings of providing various notifications, including “disk approaching a threshold full level” (Ex. 1104, 6:44–45), “would have improved the database system of Bernstein by allowing it to proactively delete old versions before the database runs out of storage space – thereby allowing the database to consistently maintain a

minimal level of space (as defined by the ‘threshold’).” Pet. 27–28 (citing Ex. 1104, 5:24–32, 6:44–45; Ex. 1102 ¶ 70). Petitioner asserts that the combination of Bernstein and Rubin

would have predictably resulted in the database system of Bernstein with the ability to monitor the amount of available disk space memory to determine whether the conditions of “disk full” or “disk approaching a threshold full level” (Rubin, 6:44-45), have occurred, to which the database system could respond by automatically deleting old versions.

Pet. 25. Petitioner, therefore, relies on Rubin’s monitoring of disk storage space and argues that combining this functionality with Bernstein would have been advantageous to proactively alert Bernstein’s data manager of impending disk space shortages rather than waiting until the data manager “run[s] out of space for storing versions” (Ex. 1103, 154) to free up disk space. Pet. 25–28.

Patent Owner argues that “[a]ll of the purported motivations proffered by Petitioners presume that the [person of ordinary skill in the art] would attempt to devise a garbage collection algorithm for MVTO,” which, according to Patent Owner, Bernstein does not disclose. PO Resp. 37–38.

Patent Owner argues the following:

Petitioners do not . . . address the fundamental underlying question: Why would the [person of ordinary skill in the art] attempt to use Bernstein’s MVTO, which would have required the [person of ordinary skill in the art] to devise a new garbage collection algorithm with no reasonable expectation of success, where Bernstein does not disclose one, and where one was not commonly known in the art, while disregarding other single- and multi-version concurrency control methods with known practical algorithms?

PO Resp. 37–38.

We disagree with Patent Owner’s premise that Bernstein does not

disclose a “garbage collection” scheme for MVTO. As we discuss above, according to Patent Owner, “[i]dentifying which versions can be deleted and recovering the space associated with them” is “a concept known as ‘garbage collection.’” PO Resp. 22 (citing Ex. 2013, 50:14–25; Ex. 2014, 88:20–89:11). Bernstein discloses deleting the oldest versions when space has run out, i.e., “garbage collection” commensurate with the scope of claim 8. Ex. 1103, 154.

We are persuaded Petitioner’s articulated reasons to combine the teachings of Bernstein and Rubin have a rational underpinning, and specifically, we find a person of ordinary skill in the art would have been motivated to combine Rubin’s monitoring of disk storage space with Bernstein to proactively alert Bernstein’s data manager of impending disk space shortages rather than waiting until the data manager “run[s] out of space for storing versions.” *See* Ex. 1102 ¶¶ 68–70. We agree with Dr. Gibbons that maintaining “a minimal level of space, in turn, would have avoided the need to suspend the database system to perform deletion of old versions.” *Id.* ¶ 70.

f. Reasonable expectation of success

Patent Owner argues a person of ordinary skill in the art would not have had a reasonable expectation of success in “combin[ing] Bernstein’s MVTO method and Rubin to design a *practical* garbage collection algorithm practicing the Claims.” PO Resp. 21 (emphasis added); *see generally id.* at 21–37. Throughout its discussion of this issue, Patent Owner repeatedly argues or implies that reasonable expectation of success requires a “practical” solution. *See, e.g., id.* at 22 (“A correct and practical garbage collection scheme is not merely the arbitrary deletion of old versions.”), 23

(“Absent some inventive, intelligent methodology, a brute-force approach to searching through the database to find multiple versions of the data items in order to identify and delete unnecessary versions was not (and is not) a practical approach.”), 25 (“[A] practical multi-versioning method in a database system requires an effective solution other than ‘brute force’ to the problem of garbage collection.”), 25 (“[A] practical garbage collection algorithm for MVTO (which Bernstein describes as its first method, and on which Petitioners have relied for the disclosure of the ‘in response to’ limitation) was not ordinary knowledge in the art as of 1997.”), 27 (“Without a practical means for garbage collection, a multi-versioning method for database systems is not useful or practical.”), 29 (alleging a “lack of disclosure in Bernstein of a practical garbage collection algorithm for its MVTO method”), 32 (alleging that “a practical method of garbage collection for MVTO was not within the common knowledge or ability of the” person of ordinary skill in the art), 34 (“While the declarations signed by Petitioners’ experts contain a lip-service, conclusory reference to enablement, those, too, do not address any reasoning to the question of whether the POSITA would have had a reasonable expectation of success to devise a practical garbage collection algorithm for MVTO.”).

We discern no legal requirement for a particular combination to yield a “practical” solution. The Court of Appeals for the Federal Circuit has stated that “[t]he reasonable expectation of success requirement refers to the likelihood of success in combining references *to meet the limitations of the claimed invention.*” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016) (emphasis added); *see also Allergan, Inc. v. Sandoz Inc.*, 726 F.3d 1286, 1292 (Fed. Cir. 2013) (“[T]he person of

ordinary skill need only have a reasonable expectation of success of developing the claimed invention.”). Independent claim 8 does not recite any requirement for a “practical” garbage collection process. Rather, claim 8 recites “deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.” As explained above, we find claim 8 encompasses the deletion of versions as taught in Bernstein.

In its Response, Patent Owner attempts to distinguish the subject matter of the challenged claims from the teachings of Bernstein and Rubin based on features from the specification of the ’371 patent, such as the use of a version list entry and a time stamp parameter “L.” *See* PO Resp. 40–45. These features, however, are not recited in the challenged claims but, rather, are recited in dependent claims 12–14 of the ’371 patent, which are not challenged in the Petition. In its Sur-Reply, Patent Owner argues that it is not attempting to import limitations from the specification into the claims but, instead, “is simply pointing out that the [person of ordinary skill in the art] would have needed *some* practical garbage collection algorithm in order to have a reasonable expectation of success in implementing Bernstein’s MVTO.” PO Sur-Reply 9. As the Supreme Court stated in *KSR*, “[w]hat matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103.” *KSR*, 550 U.S. at 419. Claim 8 does not require a “practical” garbage collection algorithm.

Patent Owner’s arguments and Dr. Jones’s testimony also touch on the level of ordinary skill in the art. According to Patent Owner, “[b]ecause of the difficulties and lack of solutions described above, the [person of

ordinary skill in the art] would have no reasonable expectation of success in designing a practical garbage collection algorithm for MVTO as of 1997.”

PO Resp. 30. Patent Owner further argues that, “if a person in 1997 invented a practical garbage collection algorithm for MVTO concurrency control, that person would not have been considered as having merely *ordinary* skill. He would have been an inventor, and/or someone of extraordinary skill.” *Id.* Furthermore, as noted above in section II.A, Dr. Jones testifies that

a person of ordinary skill in the art would not have been able to devise algorithms or conduct original design or development of new database systems. Rather, a person of ordinary skill would have been able to implement database management software, such as multi-version concurrency control, based on algorithms and designs already provided to them. As will be discussed in more detail in connection with particular arguments, designing software such as multi-version concurrency control contains theoretical aspects (such as proof of correctness) and inventive aspects (such as practical garbage collection) that were beyond the abilities of the person of ordinary skill.

Ex. 2012 ¶ 21. It may be true that it would take a person of extraordinary skill in the art to devise a *practical* garbage collection algorithm, but that question is not before us. The claims simply do not recite such a requirement. “Rather, the person of ordinary skill need only have a reasonable expectation of success of *developing the claimed invention.*” *Allergan*, 726 F.3d at 1292 (emphasis added).

We are persuaded that a person of ordinary skill in the art would have had a reasonable expectation of success in arriving at the invention recited in claim 8 based on Bernstein alone and based on the combined teachings of Bernstein and Rubin. As to Bernstein alone, as we discuss above, we find Petitioner has shown that Bernstein teaches all of the limitations of claim 8,

including the deleting limitation. Bernstein discloses deleting versions from oldest to newest when space has run out for storing intervals or versions. Ex. 1103, 154. As discussed above, Patent Owner's arguments that reasonable expectation of success requires a "practical" solution are not commensurate with the scope of claim 8. Dr. Gibbons testifies that "a person of ordinary skill in the art would not have required disclosures any more detailed than the disclosures in Bernstein to apply the prior art teachings in the manner described in this Declaration." Ex. 1102 ¶ 73. This testimony, which we credit, supports a finding that a person of ordinary skill in the art would have had a reasonable expectation of success of developing the *claimed invention* based on the teachings of Bernstein. Thus, based on Petitioner's persuasive showing, we find a person of ordinary skill in the art would have had a reasonable expectation of success in arriving at the subject matter recited in claim 8 based on Bernstein alone.

We also find that a person of ordinary skill in the art would have had a reasonable expectation of success combining the teachings of Bernstein and Rubin to arrive at the subject matter recited in claim 8. *See* Pet. 25–29; Ex. 1102 ¶¶ 64–70. In particular, we credit Dr. Gibbons's testimony that the combination "would have predictably resulted in the database system of Bernstein with the ability to monitor the amount of available disk space memory to determine whether the conditions of 'disk full' or 'disk approaching a threshold full level' (Rubin 6:44-45) have occurred" and that "[a] person of ordinary skill in the art would have found this to be a straightforward combination." Ex. 1102 ¶¶ 64–65.

g. Conclusion as to claim 8

In summary, we find Bernstein teaches all of the limitations of claim 8, and we also find the combination of Bernstein and Rubin teaches all of the limitations of claim 8. In addition, we find that a person of ordinary skill in the art would have had a reasonable expectation of success in arriving at the invention recited in claim 8 based on Bernstein alone and based on the combined teachings of Bernstein and Rubin. We also find that a person of ordinary skill in the art would have been motivated to combine the teachings of Bernstein and Rubin. Having considered the full record developed during trial, we conclude Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 8 would have been obvious under 35 U.S.C. § 103(a) based on Bernstein alone and based on the combined teachings of Bernstein and Rubin.

4. Claims 9 and 10

Claim 9 depends from claim 8 and recites “said time stamp is generated as a function of a time stamp counter.” Claim 10 recites: “The method as recited in claim 9 further comprising the step of incrementing said time stamp counter.” Although Patent Owner does not provide specific arguments regarding claims 9 and 10 beyond its arguments for independent claim 8, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware LLC, v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). For the reasons explained below, we determine Petitioner has met its burden.

Petitioner argues Bernstein teaches the limitations of claims 9 and 10. Pet. 32–33 (citing Ex. 1103, 85). In particular, Bernstein discloses: “Usually, TMs [(transaction managers)] assign timestamps to transactions.

If there is only one TM in the entire system, then it can easily generate timestamps by maintaining a counter. To generate a new timestamp, it simply increments the counter and uses the resulting value.” Ex. 1103, 85. According to Petitioner, this passage of Bernstein “satisfies the limitations of claims 9 and 10 because it discloses that the system described in Bernstein maintains ‘**a counter,**’ and assigns new timestamps by incrementing the timestamp counter and using the just-incremented counter value.” Pet. 33. We are persuaded by Petitioner’s argument, and we find Bernstein teaches the additional limitations recited in claims 9 and 10.

Having considered the full record developed during trial, we conclude Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 9 and 10 would have been obvious under 35 U.S.C. § 103(a) based on Bernstein alone and based on the combined teachings of Bernstein and Rubin.

III. WEIGHT OF TESTIMONY

Patent Owner argues “the Board should not give any weight to the testimon[y] of” Dr. Gibbons for various reasons, including his alleged “shallow analysis and understanding of the claimed invention, as well as [his] mere rubber-stamping of a *verbatim* copy of another declarant’s earlier-filed declaration as [his] own.” PO Resp. 9–16. Patent Owner was afforded the opportunity to, and did, cross-examine Dr. Gibbons regarding the testimony he provided in his declaration. *See* Ex. 2013 (transcript of Gibbons deposition). Patent Owner highlights some of that testimony as allegedly undermining Dr. Gibbons’s credibility. For example, Patent Owner quotes the following question and answer:

[Q] So is it fair to say that sitting here now you don't know what the inventors of the '371 patent meant by referring to logical aging?

[A] Correct.

Ex. 2013, 101:7–11 (objection omitted), *quoted in* PO Resp. 11. The phrase “logical aging,” however, is not recited in the challenged claims. Although Dr. Gibbons’s inability to explain “logical aging” may indicate his unfamiliarity at the time of his deposition with certain aspects of the '371 patent specification, we do not see this as a reason to completely ignore his testimony regarding the subject matter recited in the challenged claims.

Therefore, we do not agree with Patent Owner that Dr. Gibbons’s testimony should be given no weight. Rather, we have weighed the evidence before us in arriving at our conclusions, as laid out in our analysis above.

IV. CONCLUSION

For the reasons discussed above, we determine Petitioner has proven, by a preponderance of the evidence, that claims 8–10 of the '371 patent are unpatentable under 35 U.S.C. § 103(a) over the teachings of Bernstein alone and also over the combined teachings of Bernstein and Rubin.

V. ORDER

Accordingly, it is:

ORDERED that claims 8–10 of U.S. Patent No. 6,125,371 have been shown to be unpatentable; and

IPR2018-00017
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FURTHERED 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.

IPR2018-00017
Patent 6,125,371

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Attachment 2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HULU, LLC,
Petitioner,

v.

SOUND VIEW INNOVATIONS, LLC,
Patent Owner.

Case IPR2018-00017
Patent 6,125,371

Before DEBRA K. STEPHENS, DANIEL J. GALLIGAN, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

GALLIGAN, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. *Background*

Hulu, LLC (“Petitioner”) filed a Petition to institute *inter partes* review of claims 8–10 of U.S. Patent No. 6,125,371 (Ex. 1101, “the ’371 patent”). Paper 5 (“Pet.”). Sound View Innovations, LLC (“Patent Owner”) filed a Preliminary Response. Paper 11 (“Prelim. Resp.”).

Petitioner also filed a Motion for Joinder with IPR2017-00985. Paper 4. We dismissed that Motion as moot because we terminated IPR2017-00985 pursuant to 35 U.S.C. § 317(a) at the request of the parties to that proceeding. Paper 13.

Petitioner also filed a Motion for District Court-Type Claim Construction under 37 C.F.R. § 42.100(b). Paper 3. As discussed below, we grant this Motion.

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

After considering the Petition, the Preliminary Response, and associated evidence, we institute an *inter partes* review as to claims 8–10 of the ’371 patent.

B. *Real Parties in Interest*

Petitioner states: “Hulu, LLC, is the real party-in-interest. The following entities own ten percent or more of the stock of Petitioner, and

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may also be considered real parties-in-interest: The Walt Disney Company, 21st Century Fox, Comcast Corporation, and Time Warner Inc.” Pet. 1. As real parties in interest, Patent Owner identifies itself and Sound View Innovation Holdings, LLC. Paper 10, 1.

C. Related Matters

The parties identify various district court litigations involving the ’371 patent. Pet. 1–2; Paper 10, 1–2. The ’371 patent was at issue in IPR2017-00985, which we terminated as discussed above. The ’371 patent is also at issue in IPR2018-00096 and IPR2018-00366.

D. The ’371 Patent

The ’371 patent, entitled “System and Method for Aging Versions of Data in a Main Memory Database,” generally describes systems and methods for managing versions of data records in a database to increase data capacity. Ex. 1101, Abstract, 2:55–62. The Background of the ’371 patent explains that “[d]atabase systems typically include a database manager (‘DBM’) and a database (i.e., a data repository).” *Id.* at 1:13–15. “A DBM is a control application that supervises or manages interactions between application tasks and the database.” *Id.* at 1:15–17.

Figure 1 of the ’371 patent is reproduced below.

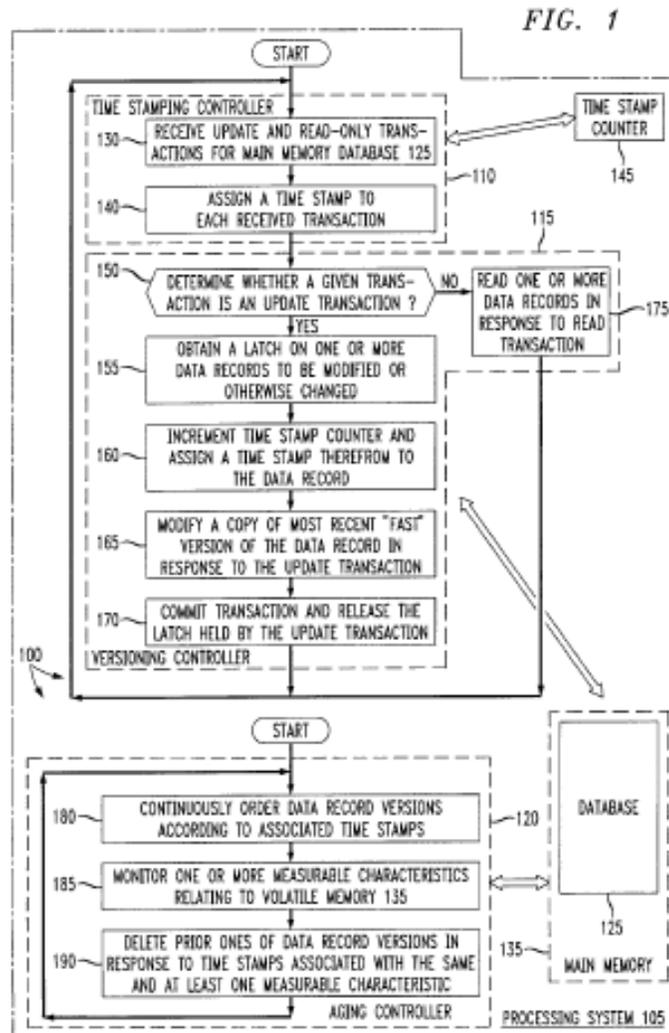


Figure 1 depicts a flow diagram of an exemplary method for controlling multi-versioned data records. Ex. 1101, 3:36–38.

Version manager 100 may be software-based and executable by any suitably arranged processing system 105 (e.g., a computer, communications switch, etc.). Version manager 100 includes three controllers, namely, a time stamping controller 110, a versioning controller 115 and an aging controller 120. Those skilled in the art should be familiar with the use of controllers in processing environments generally and, more specifically, with main memory databases. Controllers may be implemented in software, firmware, hardware, or some suitable combination of at least two of the three.

Id. at 4:47–57. Time stamping controller 110 receives update and read-only transactions for main memory database 125 (step 130). *Id.* at 4:58–60. “In response, time stamping controller 110 assigns a time stamp to each received transaction, step 140.” *Id.* at 4:62–64. “[V]ersioning controller 115 determines whether a given transaction is an update transaction, decisional step 150.” *Id.* at 5:5–7.

If the transaction is an update transaction, . . . versioning controller 115 (1) obtains a “X” lock on one or more data records to be modified (or otherwise changed), step 155, (2) modifies a copy of the most recent “past” version of the data record in response to the update transaction, creating a new “current” or “successor” version, step 165 and (3) commits the transaction, at which time it increments time stamp counter 145, assigns a time stamp therefrom to the new “successor” versions of the updated data records and releases the “X” lock held by the update transaction, step 170.

Ex. 1101, 5:7–18. Aging controller 120 “monitors main memory database 125 to (1) continuously order (e.g., sort, arrange, etc.) multiple versions of ones of the data records according to their associated time stamps, step 180 and (2) monitor one or more measurable characteristics describing, relating to, or otherwise associated with a utilization or capacity of main memory 135, step 185.” *Id.* at 5:36–44. Aging controller 120 also deletes earlier versions of data records in response to the time stamp associated with those versions and at least one measurable main memory characteristic (step 190). *Id.* at 5:44–48.

E. Illustrative Claims

Claim 8, which is reproduced below, is an independent claim, and claims 9 and 10 depend from claim 8.

8. A method of operating a processing system for use with a database of data records, said database stored in a memory, comprising the steps of:

assigning a time stamp to transactions to be performed on said database;

creating multiple versions of ones of said data records affected by said transactions that are update transactions;

monitoring a measurable characteristic of said memory; and

deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.

F. Applied References and Declaration

Petitioner relies on the following references and declaration in support of its asserted grounds of unpatentability.

Exhibit No.	Reference
1102	Declaration of Phillips B. Gibbons, Ph.D.
1103 (Parts 1–3)	Excerpts from Philip A. Bernstein et al., <i>Concurrency Control and Recovery in Database Systems</i> (1987) (“Bernstein”)
1104	U.S. Patent No. 5,155,842 to Rubin (“Rubin”)

Pet. iii.¹

G. Asserted Ground of Unpatentability

Petitioner contends that claims 8–10 of the ’371 patent are unpatentable under 35 U.S.C. § 103(a)² based on the combined teachings of Bernstein and Rubin. Pet. 3.

¹ Although the “List of Exhibits” page is numbered “i” in the Petition, it follows page ii and precedes page 1, and, therefore, we refer to this page as “Pet. iii.”

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the challenged claims of the ’371 patent have an effective filing date before the

II. ANALYSIS

A. Claim Construction

1. Standard of Construction

Our Rules provide:

A claim in an unexpired patent that will not expire before a final written decision is issued shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. A party may request a district court-type claim construction approach to be applied if a party certifies that the involved patent will expire within 18 months from the entry of the Notice of Filing Date Accorded to Petition. The request, accompanied by a party's certification, must be made in the form of a motion under § 42.20, within 30 days from the filing of the petition.

37 C.F.R. § 42.100(b).

In this proceeding, Petitioner timely filed a motion pursuant to 37 C.F.R. § 42.100(b) (1) certifying that the '371 patent "expired no later than August 19, 2017" and (2) requesting district court-type claim construction. Paper 3, 1–2. Patent Owner did not oppose Petitioner's motion. *See* 37 C.F.R. § 42.23.³ Consequently, we grant Petitioner's unopposed motion requesting district court-type claim construction.

In applying district court-type construction, we are guided by the principle that the words of a claim "are generally given their ordinary and customary meaning," as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303,

effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

³ In IPR2017-00985, Patent Owner stated that the '371 patent expired no later than August 19, 2017. IPR2017-00985, Paper 6, 1, Paper 7, 1.

1312–13 (Fed. Cir. 2005) (en banc) (citation omitted). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). There is a “heavy presumption,” however, that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

2. *Petitioner’s Proposed Constructions*

Petitioner argues that the terms “update transactions” and “data record” are defined in the Specification of the ’371 patent. Pet. 4–5 (citing Ex. 1101, 1:51–54, 3:57–60). We agree with Petitioner that these terms are defined in the Specification of the ’371 patent. In particular, the ’371 patent states that “conventional main memory DBMs delay the processing of *transactions that modify portions of the database* (termed ‘update transactions’).” Ex. 1101, 1:52–54 (Petitioner’s proposed construction emphasized). The ’371 patent further states that “the phrase ‘data record,’ as used herein, is defined broadly to mean *any file, entry, record, field, item and other data associated with at least one database* (or any suitable data repository for that matter).” Ex. 1101, 3:57–60 (Petitioner’s proposed construction emphasized). Patent Owner does not provide an alternative construction for either term. *See generally* Prelim. Resp.

Given that Petitioner’s proposed constructions are taken directly from the Specification of the ’371 patent, we adopt Petitioner’s proposed

constructions of these terms to the extent necessary for purposes of this Decision. *See* Pet. 4–5.

3. *Patent Owner’s Arguments*

Patent Owner contends “Petitioner failed to offer any construction of the ‘measurable characteristic of said memory’ terms in the monitoring step and deleting step.” Prelim. Resp. 23. According to Patent Owner, therefore, Petitioner did not satisfy 37 C.F.R. § 42.104(b)(3), which requires a petition to identify “[h]ow the challenged claim is to be construed.” *Id.*

Although it may be necessary, in certain circumstances, for a petitioner to set forth express claim construction proposals for certain terms, the Rules do not require a petitioner to set forth express constructions for every term of a claim challenged in the petition. As discussed further below, Petitioner identifies the disclosure in the prior art that it contends teaches a “measurable characteristic of said memory.” *See* Pet. 21–25. On this record, we determine that Petitioner’s contentions are sufficient to satisfy 37 C.F.R. § 42.104(b)(3).

4. *Remaining Terms*

We determine no other terms require express construction for purposes of this Decision.

B. Asserted Ground

1. *Overview*

Petitioner argues claims 8–10 of the ’371 patent would have been obvious over the combined teachings of Bernstein and Rubin and relies upon the Declaration of Dr. Phillip B. Gibbons (Ex. 1102) to support its arguments. Pet. 3, 13–33. For the reasons set forth below, we grant institution of *inter partes* review of these claims on this ground.

2. *Legal Principles*

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;⁴ and (4) any secondary considerations, if in evidence.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

3. *Obviousness of Claims 8–10 over the Combined Teachings of Bernstein and Rubin*

a. *Overview of the References*

i. *Bernstein (Ex. 1103, Parts 1–3)*

Exhibit 1103 contains excerpts from a 1987 textbook on database systems, entitled “Concurrency Control and Recovery in Database

⁴ Petitioner proposes an assessment of the level of ordinary skill in the art. Pet. 5 n.1; *see* Ex. 1102 ¶ 11. At this time, neither Patent Owner nor its declarant, Dr. Mark T. Jones, proposes an alternative assessment. Ex. 2004 ¶ 19 (“I will assume for purposes of the present declaration that [Dr. Gibbons’s] opinion [regarding the level of ordinary skill in the art] reflects the level of ordinary skill in the art of the ’371 Patent, to the extent it is relevant to my testimony.”). For purposes of this Decision, and to the extent necessary, we adopt Petitioner’s assessment.

⁵ Patent Owner does not present arguments or evidence of such secondary considerations in the Preliminary Response.

Systems.”⁶ Petitioner asserts that “Bernstein qualifies as prior art to the claims of the ’371 patent under 35 U.S.C. § 102(b) (pre-AIA).” Pet. 7. Petitioner introduces additional evidence that the Bernstein textbook was published in 1987. *See* Exs. 1106 (Bernstein textbook excerpts, including title page and date stamp from Library of Congress), 1107 (Bernstein textbook excerpts, including stamp from the University of Michigan Libraries and date annotation).

The statute governing *inter partes* reviews provides, in part:

A petition filed under section 311 may be considered only if . . .

(3) the petition identifies, in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim, including . . . copies of patents and printed publications that the petitioner relies upon in support of the petition; and . . .

(5) the petitioner provides copies of any of the documents required under paragraphs (2), (3), and (4) to the patent owner or, if applicable, the designated representative of the patent owner.

35 U.S.C. § 312(a).

Patent Owner argues the Petition is deficient because Petitioner submitted only a portion of the Bernstein textbook rather than a complete copy of the textbook, which Patent Owner asserts is required by statute. *See generally* Prelim. Resp. 36–55. As such, Patent Owner contends that “Petitioner’s Proposed Ground should be denied as incomplete as a matter of law.” Prelim. Resp. 38. Although Petitioner provided only particular

⁶ In this Decision, we refer to Exhibit 1103 as “Bernstein,” and we refer to the full textbook as “the Bernstein textbook.”

excerpts from a textbook (as noted by Petitioner in its Exhibit List (Pet. iii)), we do not agree that this alone warrants denial of institution. As noted above, the statute requires a petitioner to provide the patent owner with “copies of patents and printed publications that the petitioner relies upon in support of the petition.” 35 U.S.C. § 312(a). In this case, Petitioner relies on the portions of the Bernstein textbook that it filed as Exhibit 1103, and, therefore, Petitioner has provided copies of the prior art that it “relies upon in support of the petition.”

Furthermore, Patent Owner does not dispute that the Bernstein textbook is a printed publication within the meaning of § 102(b). Patent Owner, rather, argues that the relied-upon excerpts of Bernstein themselves do not qualify as a prior art printed publication. *See* Prelim. Resp. 43–46. In support of this argument, Patent Owner makes the following analogy to a reference within a library:

A long book available to the public is analogous to a large library open to the public. If a library contains a reference that purportedly made an invention obvious, but the interested public of ordinary skill researching the problem would not have been able to pinpoint that particular reference from among the library’s voluminous holdings using ordinary research tools, then the reference is not available as prior art and its teaching will not render the invention obvious. And if a book hundreds of pages long has one or two pages purportedly relevant to obviousness, but the ordinary interested public would not have been able to locate that snippet with customary research aids—because, for example, the book was voluminous or gave insufficient hints that these teachings were present within it—then the teachings on those pages are not available as prior art against the invention and will not render it obvious.

Prelim. Resp. 45–46 (citing *In re Lister*, 583 F.3d 1307, 1311–14 (Fed. Cir. 2009)). According to Patent Owner, “Petitioner offers no evidence that [the

relied-upon portions of Bernstein], among the hundreds of pages of Bernstein would have been found by interested researchers exercising reasonable diligence. The mere fact that Bernstein was available for perusal is not enough.” Prelim. Resp. 46.

Patent Owner, however, has not directed us to any authority holding that an excerpt of an otherwise accessible printed publication does not itself qualify as prior art under § 102(b) simply because the entirety of the publication is voluminous. On the current record, we are persuaded the Bernstein textbook was publicly accessible more than one year before the filing of the application for the ’371 patent, and, thus, Petitioner has set forth sufficient evidence showing that the Bernstein textbook is a printed publication within the meaning of section 102(b). *See* Exs. 1103, 1106, 1107. Therefore, we are persuaded that the material within the Bernstein textbook may be relied upon to show obviousness under § 103(a).

As explained in detail below, we determine that the “reasonable likelihood” standard has been satisfied by the evidence currently of record, including Bernstein. In particular, although the entire Bernstein textbook is not currently of record, we are persuaded that the portions of the Bernstein textbook upon which Petitioner relies (Exhibit 1103) in combination with Rubin are sufficient evidence to satisfy the threshold for institution.⁷ To

⁷ Patent Owner introduced testimonial evidence from Dr. Mark T. Jones with its Preliminary Response. Ex. 2004. This evidence primarily concerns two subjects: (1) the technology of the ’371 patent (*id.* ¶¶ 21–35) and (2) the incompleteness of Bernstein (*id.* ¶¶ 36–50). In deciding to institute trial, we have reviewed and considered Dr. Jones’s testimony. As Patent Owner notes, however, Dr. Jones’s testimony in Exhibit 2004 “is not directed to contesting factual assertions in the Petition or the declaration accompanying the Petition.” Prelim. Resp. 3–4 n.1.

ensure completeness of the record, however, Petitioner shall file, as a new exhibit, a complete, text-searchable copy of the Bernstein textbook within five business days of the entry of this Decision.

Bernstein explains that “[a] *database* consists of a set of named *data items*.” Ex. 1103, 2.⁸ “Each data item has a *value*.” *Id.* “A *database system (DBS)* is a collection of hardware and software modules that support commands to access the database, called *database operations* (or simply *operations*).” *Id.* (footnote omitted). For example, a “Read(*x*)” operation “returns the value stored in data item *x*,” and a “Write(*x, val*)” operation “changes the value of *x* to *val*.” *Id.*

Bernstein teaches a number of techniques for addressing concurrent access problems. *Id.* at 1. In particular, Bernstein explains that “[w]hen two or more transactions execute concurrently, their database operations execute in an *interleaved* fashion. That is, operations from one program may execute in between two operations from another program. This interleaving can cause programs to behave incorrectly, or *interfere*, thereby leading to an inconsistent database.” *Id.* at 11. One of the techniques described in Bernstein to provide concurrency control is referred to as “multiversion concurrency control.” *Id.* at 143. “In a multiversion concurrency control algorithm, each Write on a data item *x* produces a new copy (or *version*) of *x*.” *Id.* Thus, when a database operation modifies the value of a data item, the system creates a new version of that item.

“The benefit of multiple versions for concurrency control is to help the scheduler avoid rejecting operations that arrive too late.” *Id.* Bernstein

⁸ Our citations are to the page numbers of the Bernstein reference itself, rather than to the page numbers of Exhibit 1103.

explains that, with multiversion concurrency control, “each transaction has a unique timestamp” and that “[e]ach operation carries the timestamp of its corresponding transaction.” *Id.* at 153; *see also id.* at 5 (“transactions that write into the database (called *update transactions* or *updaters.*)”). For example, as noted above, each Write operation produces a new copy or version of *x* (*id.* at 143), and the new version is “labeled by the timestamp of the transaction that wrote it.” *Id.* at 153.

Bernstein acknowledges that “[a]n obvious cost of maintaining multiple versions is storage space. To control this storage requirement, versions must periodically be purged or archived.” *Id.* at 143–44. Bernstein explains that versions may be purged or archived when the system has run out of storage space. In particular, Bernstein teaches that:

Eventually, the scheduler will run out of space for storing intervals, or the [data manager] will run out of space for storing versions. At this point, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Id. at 154.

ii. Rubin (Ex. 1104)

Rubin, entitled “Logical Event Notification Method and Apparatus,” discloses a technique for monitoring devices and programs in a computer network for certain events (such as running out of storage space) and notifying other programs that those events have occurred. Ex. 1104, Abstract, 1:67–2:2. Rubin’s Figure 1 is reproduced below.

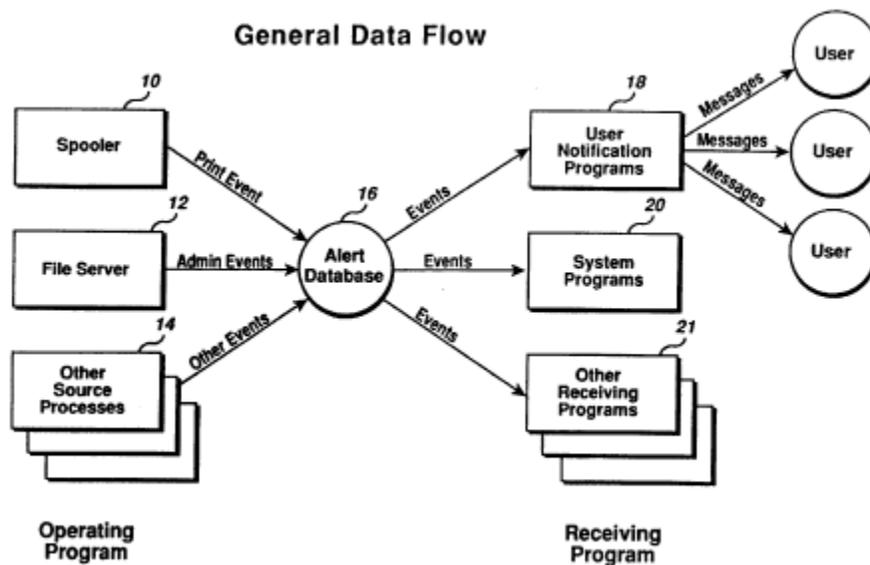


Figure 1

Figure 1 depicts “a schematic of a logical event notification flow from an operating program, through the alert database to a receiving program.” *Id.* at 2:66–68. Operating programs 10, 12, and 14 perform functions for controlling devices or are controlled by devices or the network. *Id.* at 3:10–12. “The operating program is the source of the event; it may be referred to as the source program. As programs operate on the network, logical events occur.” *Id.* at 3:12–15; *see also id.* at 4:64–65 (“Any program operating on the network may become a source program.”).

Rubin teaches a variety of logical events that may be produced by source programs. *Id.* at 2:51–53 (“A further advantage of the invention is that the event triggering the notification in the operating program is software defined.”). In particular, Rubin teaches that the logical events may include “disk events, such as, ‘disk full,’ ‘disk approaching a threshold full level,’ ‘disk error,’ ‘failure in reading disk,’ ‘failure to write data to disk,’ or the like.” *Id.* at 6:43–49. Once the operating program detects a logical event, it invokes alert database 16. *Id.* at 3:15–24. Alert database 16 maintains a

record of which programs receive notification of the event, i.e., receiving programs 18, 20, and 21. *Id.* at 3:25–34. While receiving programs 18 and 20 notify a user (*id.* at 3:38–41) or a system administrator (*id.* at 3:54–56) of the occurrence of an event, other receiving programs 21 perform other functions. For example, “[o]ther receiving programs 21 may store the event or take action based on the event type.” *Id.* at 3:56–58. That action can include automatically deleting older programs when Rubin’s system determines that the data stored on the disk has reached, exceeds, or is approaching a threshold amount.

In one embodiment of the invention, the system administrator is automatically alerted whenever the quantity of data on the disk exceeds a threshold amount. The administrator may then take action to conserve disk space or delete programs. *The program may automatically delete the oldest versions of some programs to obtain more disk space.* The program may send mail to users using significant disk space and ask them to clean-up [] their databases and remove unnecessary data. *Id.* at 5:24–32 (emphasis added).

b. Independent Claim 8

Claim 8 is directed to “[a] method of operating a processing system for use with a database of data records, said database stored in a memory.” Petitioner argues Bernstein teaches such a method. Pet. 13–15 (citing Ex. 1103, 2, 17; Ex. 1102 ¶ 44). Bernstein describes a database system (DBS) as “a collection of hardware and software modules that support commands to access the database” and further discloses that “the DBS executes on a *centralized* computer system.” Ex. 1103, 2, 17. We are persuaded that Bernstein teaches the preamble of claim 8.

i. Assigning a time stamp

Claim 8 further recites the step of “assigning a time stamp to transactions to be performed on said database.” Bernstein teaches that “[a]s for all [timestamp ordering (“TO”)] schedulers, each transaction has a unique timestamp, denoted $ts(T_i)$. Each operation carries the timestamp of its corresponding transaction. Each version is labeled by the timestamp of the transaction that wrote it.” Ex. 1103, 153, *quoted in* Pet. 16; *see* Ex. 1102 ¶ 45. Thus, we are persuaded that Bernstein teaches this limitation of claim 8.

ii. Creating multiple versions of data records

In addition, claim 8 recites the step of “creating multiple versions of ones of said data records affected by said transactions that are update transactions.” According to Petitioner, Bernstein teaches that “when a ‘**Write**’ operation is to be performed on an item in the database, the software generates a new version of the item.” Pet. 19 (citing Ex. 1103, 143). In particular, Bernstein discloses that, “[i]n a multiversion concurrency control algorithm, each Write on a data item x produces a new copy (or *version*) of x . The [data manager (“DM”)] that manages x therefore keeps a list of versions of x , which is the history of values that the DM has assigned to x .” Ex. 1103, 143. As discussed above, Bernstein discloses that the operation “Write(x , val) changes the value of x to val .” Ex. 1103, 2, *quoted in* Pet. 20; *see* Ex. 1102 ¶¶ 48, 49. Although these passages of Bernstein refer to an “operation,” rather than a “transaction,” we credit Petitioner’s declarant’s testimony that this difference is immaterial. Ex. 1102 ¶ 50; *see* Ex. 1103, 2

(referring to “*database operations* (or simply *operations*)”).⁹ Thus, we are persuaded that Bernstein teaches this limitation of claim 8.

iii. Monitoring a measurable characteristic

Claim 8 further recites the step of “monitoring a measurable characteristic of said memory.” In its contentions as to this limitation, Petitioner relies on the following passage of Bernstein:

Eventually, the scheduler will run out of space for storing intervals, or the [database manager] will run out of space for storing versions. At this point, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Ex. 1103, 154, *quoted in* Pet. 21.

With regard to the “monitoring” step, Petitioner argues:

Although the passage from Bernstein above does not expressly state that the system “**monitor[s] a measurable characteristic of said memory,**” it would have been obvious to a person of ordinary skill in the art that the disclosures in Bernstein disclose this step. ([Ex. 1102] ¶ 52.) Bernstein explains that “[a]n obvious cost of maintaining multiple versions is storage space. To control this storage requirement, versions must be periodically purged or archived.” ([Ex. 1103,] 143–44.) To this end, the passage quoted above indicates that Bernstein can detect when it has “**run out of space**” for storing intervals or data items, and can respond to that condition by deleting older versions. (*Id.*, p.154.) Therefore, it would have been obvious that this functionality discloses the ability to ascertain the amount of available space for storing items, *i.e.*, monitoring a measurable characteristic of the system’s memory. ([Ex. 1102] ¶ 52.) Otherwise, the system could not determine when it has run out

⁹ We note, however, that Bernstein also teaches “transactions that write into the database” are “called *update transactions* or *updaters*.” Ex. 1103, 5.

of space. (*Id.*) Moreover, determining the amount of free space or memory was a standard and well-known feature. (*Id.*)

The Petitioner acknowledges that Bernstein does not explain how, from a technical standpoint, the system in Bernstein determines that it has “run out of space” for storing intervals or versions. It is possible that the patent owner might take a narrow position on the “monitoring” limitation in order to assert that Bernstein alone does not sufficiently disclose the claimed “monitoring” feature, or could argue for a different interpretation of the teachings of Bernstein. For this reason, this Petition also cites to the **Rubin** reference. Rubin clearly and explicitly discloses the claimed monitoring feature and, as explained above, is readily combinable with the database system in Bernstein.

Pet. 21–23; *see* Ex. 1102 ¶ 52.

Petitioner relies on Rubin’s disclosure of “monitoring logical events on a network and notifying programs desiring information on specified types of events.” Ex. 1104, 1:68–2:2, *quoted in* Pet. 23. Rubin discloses that these logical events can include “disk events, such as, ‘disk full,’ ‘disk approaching a threshold full level,’ ‘disk error,’ ‘failure in reading disk,’ ‘failure to write data to disk,’ or the like.” Ex. 1104, 6:43–46, *quoted in* Pet. 23. Further, Rubin discloses that “the system administrator is automatically alerted whenever *the quantity of data on the disk* exceeds a threshold amount.” Ex. 1104, 5:24–26 (emphasis added), *quoted in* Pet. 24.

Patent Owner argues the combination of Bernstein and Rubin does not teach “monitoring a measurable characteristic of said memory.” Prelim. Resp. 16–23. According to Patent Owner, “[i]n the context of the [’371] Patent, a monitored ‘measurable characteristic of . . . memory,’ includes and depends on a value that can be ‘monitored’ and measured, such as ‘0.51.’” Prelim. Resp. 17 (third alteration in original). In attempting to distinguish

the disclosure of Rubin from the claimed subject matter, Patent Owner asserts that “[r]eceiving a ‘disk full’ or ‘disk exceeds a threshold amount’ alert and deleting records in response to it is not the same as, for example, measuring the remaining amount of free memory.” Prelim. Resp. 20.

On the current record, we are persuaded the combination of Bernstein and Rubin teaches “monitoring a measurable characteristic of said memory.” The ’371 patent describes that

aging controller 120 determines a current value of L in response to one or more *measurable main memory characteristics*, step 200, *such as a current utilization or capacity of main memory*, a trend analysis of a utilization or capacity of main memory over a time period (t), or any other applied mathematics- or statistics-based analysis, including a comparison of any of the same with a threshold, ceiling/floor, limit, set point or the like.

Ex. 1101, 6:46–53 (emphasis added). According to the ’371 patent, therefore, a memory’s current utilization or capacity are measurable characteristics of the memory. *See also* Ex. 1101, 3:9–10 (“monitors at least one measurable characteristic (such as current utilization or capacity of main memory)),” 5:41–43 (“monitor one or more measurable characteristics describing, relating to, or otherwise associated with a utilization or capacity of main memory”). As discussed above, Rubin expressly discloses “monitoring logical events on a network,” including events such as “disk full” and “disk approaching a threshold full level.” Ex. 1104, 1:68, 6:44–45. On this record, we are persuaded monitoring whether a disk is “approaching a threshold full level” teaches monitoring current utilization or capacity of that memory. Indeed, Patent Owner appears to acknowledge that “measuring the remaining amount of free memory” is within the scope of “monitoring a measurable characteristic” of memory (Prelim. Resp. 20), and

we are persuaded such monitoring is taught by Rubin's disclosure of monitoring whether a disk is "approaching a threshold full level." Furthermore, Bernstein itself teaches taking certain actions upon running out of storage space (Ex. 1103, 154), which means that the memory is determined to be fully utilized and to have no available capacity.

Thus, we are persuaded that the combination of Bernstein and Rubin teaches this limitation of claim 8.

iv. Deleting versions

Finally, claim 8 recites the step of "deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory." Petitioner argues that Bernstein teaches deleting old versions of data items and their corresponding intervals to recover storage space. Pet. 29–30 (citing Ex. 1103, 143, 154). Further, because the deletions may be based on the age of the version, as well as the storage space available, Petitioner argues the combination of Bernstein and Rubin teaches that such deletions are "in response to said time stamp and said measurable characteristic." Pet. 30–31 (citing Ex. 1103, 154; Ex. 1104, 5:24–32); *see* Ex. 1102 ¶¶ 54–56; *see also* Ex. 1103, 153 ("largest," i.e., latest, time stamp), 161 ("smallest," i.e., earliest time stamp). As noted by Petitioner, Bernstein discloses that "[t]o avoid incorrect behavior, it is essential that versions be deleted from oldest to newest." Ex. 1103, 154, *quoted in* Pet. 30. As further noted by Petitioner, Bernstein discloses that, "[s]ince timestamps increase monotonically with time and are unique, if a transaction lives long enough it will eventually have the smallest timestamp (i.e., will be the oldest) in the system." Ex. 1103, 85–86, *quoted in* Pet. 31. Moreover,

Petitioner argues that these deletions are intended to “increase [the] capacity of said memory.” Pet. 31–32 (citing Ex. 1103, 154, 161; Ex. 1104, 5:28–30); *see* Ex. 1102 ¶ 57.

Patent Owner contends that, “[a]t best, [Bernstein and Rubin] simply base the decision whether to delete versions on the time stamp, an alert that memory is needed, and/or a determination that the version is unneeded.” Prelim. Resp. 22. On the current record, however, we are persuaded that Bernstein’s disclosure of deleting the oldest version and that the Bernstein and Rubin combination’s disclosure of monitoring memory utilization, as discussed above, and deleting records based on that monitoring teach deleting “in response to said time stamp and said measurable characteristic.”

Based on the record before us, we are persuaded that the combination of Bernstein and Rubin teaches “deleting ones of said multiple versions of said ones of said data records in response to said time stamp and said measurable characteristic thereby to increase a capacity of said memory.”

v. Rationale to combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Bernstein and Rubin in the manner asserted. Pet. 25–29; *see* Ex. 1102 ¶¶ 64–70. In particular, as noted above, Bernstein teaches that:

Eventually, the scheduler will run out of space for storing intervals, or the [database manager] will run out of space for storing versions. *At this point*, old versions and their corresponding intervals must be deleted. To avoid incorrect behavior, it is essential that versions be deleted from oldest to newest.

Ex. 1103, 154 (emphasis added). Thus, Bernstein teaches deleting older

versions only *after* the scheduler or the database manager has run out of storage space. *Id.*; *see also* Pet. 26–27; *see* Ex. 1102 ¶¶ 68–70. Petitioner’s declarant notes that Rubin teaches notifying a “write” program when a “disk [is] approaching a threshold full level.” Ex. 1102 ¶ 70 (citing Ex. 1104, 5:24–32, 6:44–45). Petitioner’s declarant further testifies that “Rubin offers a significant improvement of notifying the ‘write’ program of a potential shortage of storage space before storage space has actually run out.” Ex. 1102 ¶ 70; *see KSR*, 550 U.S. at 417 (“[I]f 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 contends Petitioner has not set forth sufficient reasoning as to why a person of ordinary skill in the art would have combined the teachings of Bernstein and Rubin in the manner asserted. *See* Prelim. Resp. 25–36. Patent Owner contends the combined teachings of Bernstein and Rubin conflict with respect to the removal of data such that there would have been no expectation of success in combining the references. Prelim. Resp. 26–28, 29–31. In particular, Patent Owner contends that Rubin requires the removal of *unnecessary* data from the database, rather than merely the oldest data. *Id.* at 27–28 (citing Ex. 1104, 5:24–32). On the record before us, we disagree.

As an initial matter, we note that Rubin teaches that “[t]he program *may* automatically delete the oldest versions of some programs to obtain more disk space. The program *may* send mail to users using significant disk space and ask them to clean-up [] their databases and remove unnecessary data.” Ex. 1104, 5:28–32 (emphases added). Thus, we understand Rubin to

describe two optional actions that *may* be taken to “conserve disk space *or* delete programs.” *Id.* at 5:27–28 (emphasis added). Furthermore, the quoted text to which Patent Owner points describes only one embodiment of Rubin’s invention (*id.* at 5:24–26), and, on this record, we are not persuaded that both optional actions must be included in every embodiment of Rubin.

Patent Owner also addresses Petitioner’s argument that, “[w]ithout an event notification system such as Rubin, the system in Bernstein might need to repeatedly and continuously ask the storage system for the amount of available free space to determine when ‘old versions and their corresponding intervals must be deleted.’” Pet. 29; Prelim. Resp. 32–36. According to Patent Owner,

Petitioner’s argument serves only to strongly confirm that the combination of Bernstein and Rubin *teaches away* from the claimed monitoring and deleting steps—because Petitioner’s assertion can only be correct *if* the “measurable characteristics” are mere Boolean event alerts, and *not* measured characteristics like those claimed on which the database system can base adaptive responses over time.

Prelim. Resp. 33. Patent Owner asserts that Petitioner’s own argument, therefore, shows that a person of ordinary skill in the art “following Rubin’s teachings would have found it unattractive to monitor the amount of available free space to determine when old versions and their corresponding intervals must be deleted, instead of using Rubin’s simple alert system.” Prelim. Resp. 33.

On the record before us, we disagree because, as discussed above, Rubin expressly discloses “monitoring logical events on a network,” including events such as “disk full” and “disk approaching a threshold full level.” Ex. 1104, 1:68, 6:44–45. We do not understand the proposed

combination of Bernstein and Rubin to eliminate Rubin's monitoring but, rather, to incorporate Rubin's monitoring with Bernstein's teachings.

Indeed, Petitioner asserts that the combination of Bernstein and Rubin

would have predictably resulted in the database system of Bernstein with the ability to monitor the amount of available disk space memory to determine whether the conditions of "disk full" or "disk approaching a threshold full level" (Rubin, 6:44-45), have occurred, to which the database system could respond by automatically deleting old versions.

Pet. 25. Petitioner, therefore, relies on Rubin's monitoring of disk storage space and argues that incorporating this functionality into Bernstein would have been advantageous to proactively alert Bernstein's data manager of impending disk space shortages rather than waiting until the data manager "run[s] out of space for storing versions" (Ex. 1103, 154) to free up disk space. Pet. 25–28.

Thus, on the current record, we do not agree that the references teach away from the combination or from the invention or that there would have been no expectation of success in combining the references. Rather, we are persuaded Petitioner has set forth sufficient articulated reasoning as to why a person of ordinary skill in the art would have combined the teachings of Bernstein and Rubin in the manner asserted. *See* Pet. 25–29; Ex. 1102 ¶¶ 64–70.

vi. Threshold determination as to claim 8

Based on our review of Petitioner's contentions and supporting evidence, we are persuaded that the combination of Bernstein and Rubin teaches the limitations of claim 8 and that Petitioner has provided sufficient reasoning as to why a person of ordinary skill in the art would have

combined the references. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing in demonstrating claim 8 is unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Bernstein and Rubin.

c. Dependent Claims 9 and 10

Claim 9 depends from claim 8 and recites “said time stamp is generated as a function of a time stamp counter.” Claim 10 recites: “The method as recited in claim 9 further comprising the step of incrementing said time stamp counter.” Petitioner argues that these claims are rendered obvious over the combined teachings of Bernstein and Rubin. Pet. 32–33 (citing Ex. 1103, 85). In particular, Bernstein discloses: “Usually, TMs [transaction managers] assign timestamps to transactions. If there is only one TM in the entire system, then it can easily generate timestamps by maintaining a counter. To generate a new timestamp, it simply increments the counter and uses the resulting value.” Ex. 1103, 85. According to Petitioner, “[t]he passage quoted above satisfies the limitations of claims 9 and 10 because it discloses that the system described in Bernstein maintains ‘**a counter,**’ and assigns new timestamps by incrementing the timestamp counter and using the just-incremented counter value.” Pet. 33.

Based on the record before us, we are persuaded, and we determine Petitioner has established a reasonable likelihood of prevailing in demonstrating claims 9 and 10 are unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Bernstein and Rubin.

C. Constitutionality

Patent Owner makes additional arguments stating that post grant review proceedings, such as this proceeding, are unconstitutional. Prelim.

Resp. 55–58. We decline to consider the constitutional challenges as, generally, “administrative agencies do not have jurisdiction to decide the constitutionality of congressional enactments” where consideration of the constitutional question would “require the agency to question its own statutory authority or to disregard any instructions Congress has given it.” *Riggin v. Office of Senate Fair Employment Practices*, 61 F.3d 1563, 1569–70 (Fed. Cir. 1995).

III. CONCLUSION

For the foregoing reasons, we are persuaded that Petitioner has shown a reasonable likelihood of prevailing in showing that claims 8–10 of the ’371 patent would have been obvious over the combined teachings of Bernstein and Rubin. We have not made a final determination with respect to the patentability of any challenged claim or the construction of any claim term.

IV. ORDER

Accordingly, it is:

ORDERED that Petitioner’s Motion for District Court-Type Claim Construction is *granted*;

FURTHER ORDERED that Petitioner shall file, as a new exhibit, a complete, text-searchable copy of the Bernstein textbook within five business days of the entry of this Decision;

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 8–10 of the ’371 patent on the following ground:

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Claims 8–10 as unpatentable under 35 U.S.C. § 103(a) as rendered obvious over the combined teachings of Bernstein and Rubin; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial. The trial will commence on the entry date of this decision.

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