United States Court of Appeals for the Federal Circuit

SEQUOIA TECHNOLOGY, LLC,
Plaintiff-Appellant

v.

DELL, INC., DELL TECHNOLOGIES INC., EMC CORPORATION, AKA DELL EMC, HEWLETT-PACKARD ENTERPRISE CO., HITACHI VANTARA CORPORATION, SUPER MICRO COMPUTER, INC., HITACHI LTD.,
Defendants-Appellees

2021-2263, 2021-2264, 2021-2265, 2021-2266

Appeals from the United States District Court for the District of Delaware in Nos. 1:18-cv-01127-LPS-CJB, 1:18-cv-01128-LPS-CJB, 1:18-cv-01129-LPS-CJB, 1:18-cv-01307-LPS-CJB, Judge Leonard P. Stark.

RED HAT, INC.,
Plaintiff/Counterclaim Defendant-Appellee

v.

SEQUOIA TECHNOLOGY, LLC,
Defendant/Counterclaim Plaintiff-Appellant

ELECTRONICS AND TELECOMMUNICATIONS

RESEARCH INSTITUTE,
Defendant-Appellant

v.

INTERNATIONAL BUSINESS MACHINES CORPO-RATION,
Counterclaim Defendant-Appellee

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2021-2267

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Appeal from the United States District Court for the District of Delaware in No. 1:18-cv-02027-LPS-CJB, Judge Leonard P. Stark.

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Decided: April 12, 2023

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ANDREI IANCU, Irell & Manella LLP, Los Angeles, CA, argued for Sequoia Technology, LLC, Electronics and Telecommunications Research Institute. Also represented by ALAN J. HEINRICH; PHILIP J. WARRICK, Washington, DC; JOHN E. LORD, Skiermont Derby, LLP, Los Angeles, CA; WILLIAM J. O'BRIEN, One LLP, Newport Beach, CA.

JOHN C. O'QUINN, Kirkland & Ellis LLP, Washington, DC, argued for Dell, Inc., Dell Technologies Inc., EMC Corporation, Hewlett-Packard Enterprise Co., Hitachi Vantara Corporation, Super Micro Computer, Inc., Hitachi Ltd., Red Hat, Inc., International Business Machines Corporation. Also represented by STEPHEN DESALVO; CHRISTOPHER DECORO, TODD M. FRIEDMAN, New York, NY; HERSH H. MEHTA, Benesch Friedlander Coplan & Aronoff LLP, Chicago, IL.

JACK B. BLUMENFELD, Morris, Nichols, Arsht & Tunnell LLP, Wilmington, DE, for Red Hat, Inc.

BRIAN P. EGAN, Morris, Nichols, Arsht & Tunnell LLP, Wilmington, DE, for International Business Machines Corporation.

Before LOURIE, DYK, and STOLL, *Circuit Judges.*

STOLL, *Circuit Judge.*

Sequoia Technology, LLC appeals from a stipulated judgment of noninfringement and invalidity of U.S. Patent No. 6,718,436 following an adverse claim construction ruling from the United States District Court for the District of Delaware. For the reasons below, we disagree with the district court's claim construction for "computer-readable recording medium," and thus we reverse the district court's ineligibility determination under 35 U.S.C. § 101. In addition, we agree with the district court's claim construction for "disk partition" and "logical volume," and thus we affirm the district court's noninfringement determination.

BACKGROUND

I

The technology at issue is digital storage. The '436 patent explains that servers with important data can use "Redundant Array of Independent Disks" (RAID) to store the same data on multiple hard disks. *See* '436 patent col. 1 ll. 26–32. The specification further notes how a virtual disk drive—also known as a logical volume—can encompass multiple physical disk drives. *Id.* at col. 1 ll. 24–28. A logical volume manager can implement the RAID technique with software to construct a logical volume. *Id.* The specification teaches that these advances were known, but "conventional logical volume managers ha[d] problems in that metadata is too large to manage in huge storage

structures and processing speed is too slow when modifying metadata." *Id.* at col. 3 ll. 42–64. Continuing, the specification explains that "for managing a logical volume, the huge size of metadata delays system booting time and uses too much memory." *Id.* at col. 3 ll. 43–45.

The '436 patent purports to address these problems. The patent is directed to "a method for managing a logical volume for minimizing a size of metadata and supporting dynamic online resizing," as well as "a computer-readable recording medium storing a program or data structure for embodying the method." *Id.* at Title, Abstract, col. 1 ll. 10–14, col. 3 l. 66–col. 4 l. 6. The specification explains that "using a disk partition as a volume construction unit" for the logical volume minimizes metadata. *Id.* at col. 11 l. 66–col. 12 l. 2.

The patent describes a preferred embodiment that has three storage virtualizations: extents, disk partitions, and the logical volume. *Id.* at col. 6 l. 55–col. 7 l. 20. Extents are the "minimum unit of space allocation to store information" and make up disk partitions. *Id.* at col. 7 ll. 1–3, col. 12 l. 42–43. Disk partitions are the "minimum unit of the logical volume." *Id.* at col. 6 ll. 60–61. And "[t]he logical volume is a union of disk partitions," which can be resized in disk partition units. *Id.* at col. 6 ll. 64–67.

Claims 1–3 and 8 are at issue on appeal. Claim 1 is representative and recites:

> 1. A method for managing a logical volume in order to support dynamic online resizing and minimizing a size of metadata, said method comprising steps of:
>
>> a) creating the *logical volume* by gathering *disk partitions* in response to a request for creating the logical volume in a physical storage space;

b) generating the metadata including information of the *logical volume* and the *disk partitions* forming the *logical volume* and storing the metadata to the *disk partitions* forming the logical volume,

c) dynamically resizing the *logical volume* in response to a request for resizing, and modifying the metadata on the *disk partitions* forming the *logical volume*; and

d) calculating and returning a physical address corresponding to a logical address of the *logical volume* by using mapping information of the metadata containing information of the physical address corresponding to the logical address,

wherein the metadata includes,

> a disk partition table containing information of a *disk partition* in which the metadata is stored;

> a logical volume table for maintaining the information of the *logical volume* by storing duplicated information of the *logical volume* onto all *disk partitions* of the *logical volume*;

> *an extent allocation table for indicating whether each extent in the disk partition is used or not used*; and

> a mapping table for maintaining a mapping information for a physical address space corresponding to a logical address space which is a continuous address space equal in

> size of storage space to an entirety
> of said *logical volume.*

Id. at col. 12 ll. 17–48 (emphases added to highlight disputed limitations). Independent claim 8 mirrors claim 1 except for the preamble, which recites a "computer-readable recording medium storing instructions for executing a method." *Id.* at col. 13 ll. 30–33.

II

Sequoia is the exclusive licensee of the '436 patent, which is owned by Electronics and Telecommunications Research Institute (ETRI). The accused product is Red Hat, Inc.'s software tool that can create and resize logical volumes with units smaller than a whole disk partition, such as extents.

Initially, Sequoia filed complaints against certain Red Hat customers "that make or sell products or services incorporating the accused products." Appellees' Br. 16 (citing *Sequoia Tech., LLC v. Dell Inc.*, No. 18-cv-1127, 2020 WL 5835129, at *1 (D. Del. Oct. 1, 2020) ("*Report*"), *report and recommendation adopted*, No. 18-cv-1127, 2021 WL 2010448 (D. Del. May 20, 2021) ("*Decision*")). Red Hat then filed a complaint against Sequoia, and later ETRI, seeking a declaratory judgment of noninfringement and invalidity. *Report*, 2020 WL 5835129, at *1. Sequoia counterclaimed against Red Hat and its parent company, International Business Machines Corp., for infringement. *Sequoia Tech., LLC v. Dell Inc.*, No. 18-cv-1127, 2021 WL 3878937, at *1 (D. Del. Aug. 16, 2021), *judgment entered*, No. 18-cv-1127, 2021 WL 3878938 (D. Del. Aug. 16, 2021) ("*Final Judgment*"). The district court judge consolidated the cases and referred the claim construction disputes to a magistrate judge. *Report*, 2020 WL 5835129, at *1. During litigation, Red Hat filed two petitions for inter partes reviews (IPRs), and the U.S. Patent and Trademark Office denied institution in both. *Red Hat, Inc. v. Elecs. & Telecomms. Research Inst.*, Case No. IPR2019-00465, Paper No. 15 (P.T.A.B.

June 13, 2019); *Red Hat, Inc. v. Elecs. & Telecomms. Research Inst.*, Case No. IPR2019-00467, Paper No. 14 (P.T.A.B. July 10, 2019).

Relevant to this appeal, the parties disputed the construction of several claim terms. Specifically, the parties disputed the construction of: "computer-readable recording medium"; "disk partition"; "logical volume"; and, related to the latter two claim construction issues, construed the term "used or not used" in the context of an extent's usage in an "extent allocation table."

The magistrate judge adopted Red Hat's construction and construed "computer-readable recording medium" to include transitory media (i.e., signals or waves). *Final Judgment*, 2021 WL 3878937, at *2. He looked to the specification, which discusses "computer readable medium" as "including" a list of items—none of which are transitory—and interpreted that language as leaving the door open for media that could be transitory.[1] *Report*, 2020 WL 5835129, at *14 (citing '436 patent col. 11 ll. 36–39). He also relied on Red Hat's expert's analysis that a person of ordinary

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[1]   Transitory media is "fleeting" and "devoid of any semblance of permanence during transmission." *In re Nuijten*, 500 F.3d 1346, 1356 (Fed. Cir. 2007). It can be physical, like "radio broadcasts, electrical signals through a wire, and light pulses through a fiber-optic cable," but does not possess concrete structure that would qualify as a device or machine. *Id.* at 1353, 1355. By contrast, non-transitory media can encompass a concrete structure like a "random-access memory" or "optical data storage device" and be a manufacture, matter, machine, or process. *See Mentor Graphics Corp. v. EVE-USA, Inc.*, 851 F.3d 1275, 1294 (Fed. Cir. 2017) (explaining that the challenged claim included patent-eligible embodiments, like "random-access memory" or "optical data storage device," that—unlike a carrier wave—would not run afoul of *Nuijten*).

skill in the art would have understood "computer-readable recording medium" to include transitory media; a conclusion the expert reached based on express definitions in thirty-four contemporaneous patents and patent applications. *Id.* In adopting the magistrate judge's Report and Recommendation, the district court concluded that no clear language in the specification excluded transitory media, so the extrinsic evidence was persuasive, "particularly given the lack of any substantive rebuttal from Sequoia's expert." *Decision*, 2021 WL 2010448, at *3. Because transitory media are ineligible statutory subject matter under 35 U.S.C. § 101, *see In re Nuijten*, 500 F.3d 1346, 1355, 1357 (Fed. Cir. 2007), the court entered a stipulated judgment of invalidity of claims 8–10 based on its construction of "computer-readable recording medium." *Final Judgment*, 2021 WL 3878937, at *2.

As for "disk partition" and "logical volume," the district court agreed with Red Hat and construed a "disk partition" to mean a "section of a disk that is a minimum unit of a logical volume" and a "logical volume" to mean an "extensible union of more than one disk partition, the size of which is resized in disk partition units." *Id.* at *1–2. The district court's construction thus requires that a logical volume is constructed by whole disk partitions, not subparts of disk partitions such as extents.

Finally, the district court construed the phrase "used or not used" in the limitation "extent allocation table for indicating whether each extent in the disk partition is used or not used.*" Decision*, 2021 WL 2010448, at *1. Adopting Red Hat's construction, the court held that "used or not used" means that an extent "is or is not storing information." *Id.*

Following claim construction, the parties stipulated to final judgment that, under the district court's claim construction of "logical volume" and "disk partition," the accused products do not infringe the asserted claims and

that, under the district court's construction of "computer-readable recording medium," claims 8–10 are ineligible under § 101. The district court entered judgment accordingly. The interpretation of the term "extent allocation table" was not subject to the stipulation, but its interpretation affects the construction of "disk partition" and "logical volume."

Sequoia appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

DISCUSSION

We review claim construction based on intrinsic evidence de novo and review factual findings about extrinsic evidence for clear error. *SpeedTrack, Inc. v. Amazon.com*, 998 F.3d 1373, 1378 (Fed. Cir. 2021) (citing *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331–32 (2015)). Factual findings are clearly erroneous when, although there is supporting evidence, "the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395 (1948).

On appeal, Sequoia challenges the district court's construction of (1) "computer-readable recording medium," underlying the court's judgment of ineligibility of claims 8–10 under § 101; and (2) "disk partitions," "logical volumes," and "used or not used," underlying the court's finding of noninfringement. We address each issue in turn.

I

We start with ineligibility and Sequoia's argument that the district court erred in construing "computer-readable recording medium storing instructions" as including transitory media. Appellant's Br. 41–50. Because the intrinsic evidence supports Sequoia's interpretation, we agree that the court erred.

We start with the claim language. *See Personalized Media Commc'ns, LLC v. Apple Inc.*, 952 F.3d 1336, 1340

(Fed. Cir. 2020) (explaining how we first, and primarily, rely on intrinsic evidence like claim language when construing claim terms). At the outset, we note that the claim language does not actually recite a "computer-readable medium" or CRM. Instead, it more narrowly recites "computer-readable *recording* medium *storing instructions.*" '436 patent col. 13 ll. 29–30 (emphases added). As Sequoia asserts, a person of ordinary skill would not understand transitory signals, such as carrier waves, to record or store instructions in memory systems. This is because transitory signals, by their very nature, are fleeting and do not persist over time. Other elements in the claim confirm that the claim is directed to hardware as opposed to transitory waves or signals.[2] For example, the claim recites "creating the logical volume . . . in a physical storage space," *id.* at col. 13 ll. 33–35, and "storing [sic] metadata to the disk partitions," *id.* at col. 13 ll. 38–39. The claim language thus demonstrates that claim 8 is not directed to a transient signal, but rather to a non-transient storage medium.

In our view, the specification further supports this construction. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (characterizing the specification as highly relevant and "the single best guide to the meaning of a disputed term") (citation omitted); *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1365 (Fed. Cir. 2016). The specification discloses only non-transitory media. The specification states: "[T]he present invention can be stored in a computer readable medium including compact disc read only memory (CDROM), random access memory (RAM), floppy disk, hard disk, and magneto-

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[2]   The specification states that the invention "can be embodied in hardware or software." *Id.* at col. 3 l. 1. Even if the recording and storage were implemented in software, this is not the same as a transitory signal.

optical disk." '436 patent col. 11 ll. 36–39. Every example is hardware.

On appeal, Red Hat emphasizes, as it did before the district court, that the specification states that CRM "includ[es]" non-transitory media, and thus its definition is open-ended and could include transitory media. Appellees' Br. 73–74. It is true that we have held that the term "including" is open-ended. *See, e.g.*, *Lucent Techs., Inc. v. Gateway, Inc.*, 525 F.3d 1200, 1214 (Fed. Cir. 2008). But this does not mean that "computer-readable recording medium storing instructions" as used in claim 8 and the specification is fairly understood to include transitory signals. "[C]laims . . . do not have meaning removed from the context from which they arose." *Netword, LLC v. Centraal Corp.*, 242 F.3d 1347, 1352 (Fed. Cir. 2001); *see Phillips*, 415 F.3d at 1313 (explaining the importance of reading a claim in the context of the entire patent). Here, not only is the claim term narrower—including the phrases "recording" and "storing"—but also Red Hat's proposed construction hardly makes sense in the context of the disclosed invention, which relates to hardware storage and says nothing about signals. Indeed, it is hard to imagine how the invention would be implemented as a signal. The specification states that an object of the invention is to provide "a computer-readable recording medium storing a program or data structure"—which seems irreconcilable with a transitory signal. *See* '436 patent col. 1 ll. 12–13, 19–20, col. 4 ll. 5–6, 25–26. In short, the use of a term denoting a non-exhaustive list does not eviscerate our obligation to construe terms in the context of the entire patent. The context here makes clear that the term "computer-readable recording medium" cannot encompass transitory media.

Our decision rests solely on the intrinsic evidence. We are unpersuaded by Red Hat's arguments to the contrary, which rest on extrinsic evidence. *See* Appellees' Br. 69–72. To this end, we find that the district court clearly erred in considering Red Hat's expert testimony, which is both

inconsistent with the intrinsic evidence and also based on *different* express definitions of CRM in patent specifications directed to *different* inventions.

First, Red Hat relies on its expert's analysis of thirty-four contemporaneous patents and patent applications to support its argument that a person of ordinary skill understood "computer-readable recording medium" to encompass transitory media. Appellees' Br. 69–71 (citing J.A. 551–59). This evidence merely shows that in thirty-four other specifications, the inventors chose to be their own lexicographers and expressly defined CRM or like terms to include transitory media. The inventors here chose otherwise. That other inventors chose to be their own lexicographers and define CRM to include transitory signals does not demonstrate what CRM means in the context of the '436 patent. Nor does it establish the plain and ordinary meaning of the claim term "computer-readable recording medium for storing."

Red Hat also relies on our decision in *Mentor Graphics Corp. v. EVE-USA, Inc.*, 851 F.3d 1275, 1294 (Fed. Cir. 2017). But *Mentor Graphics* does not support Red Hat's construction. There, we affirmed the district court's construction of "computer readable medium" as including transitory signals based on the specification's express definition, which included "carrier waves." *Id.* Our holding rested on the fundamental principle that "[a] patentee is free to be his own lexicographer." *Id.* We emphasized that "[e]ven though carrier waves differ greatly from the other disclosed mediums (such as CD-ROMs or magnetic tape), we are bound by the patentee's lexicography." *Id.* We did not address the situation where, as here, the patentee did not expressly define CRM to include carrier waves or other transitory signals. And that is why Red Hat's reliance on *Mentor Graphics* and thirty-four other patents and patent applications is misplaced. Those thirty-four other patents and patent applications expressly defined CRM to include

transitory media. The '436 patent does not, and our holding relies on this absence.

Further, "a court should discount any expert testimony 'that is clearly at odds with the claim construction mandated by . . . the written record of the patent.'" *Phillips*, 415 F.3d at 1318 (quoting *Key Pharms. v. Hercon Lab'ys Corp.*, 161 F.3d 709, 716 (Fed. Cir. 1998)). Simply put, extrinsic evidence of what other inventors chose to do cannot surmount the intrinsic evidence of what the inventors chose here; context is key in claim construction. *See id.* at 1313; *see also id.* at 1317 (extrinsic evidence is "less significant" than intrinsic evidence in determining the legally operative meaning of claim terms); *id.* at 1321 (explaining how one of the main problems with elevating extrinsic evidence is that the inquiry is in the abstract, rather than within the context of the patent); *Netword,* 242 F.3d at 1352 ("[C]laims . . . do not have a meaning removed from the context in which they arose."). Thus, the district court clearly erred in considering Red Hat's expert's analysis, which is at odds with the written record of the patent.[3]

Red Hat next argues that a memorandum from the U.S. Patent and Trademark Office compels a different construction of "computer-readable storage medium" in this case. Appellees' Br. 71–72 (citing J.A. 549 (*Subject Matter Eligibility of Computer Readable Media*, 1351 Off. Gaz. Pat. Office 212 (Feb. 23, 2010) ("Kappos Memo"))). But the Kappos Memo merely recognizes that the broadest reasonable interpretation—which is not the standard that applies in district court—may in some instances result in some

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[3]   We do not disturb the district court's finding that Sequoia's expert did not provide a substantial rebuttal to Red Hat's extrinsic evidence. *Decision*, 2021 WL 2010448, at *3 (citing *Report*, 2020 WL 5835129, at *14 (describing Sequoia's expert's opinion as "fairly brisk and conclusory")).

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claims in some patents being interpreted to cover transitory media and then rejected under § 101. J.A. 549. To overcome this problem, the Kappos Memo suggests that a so rejected claim may be amended to add the phrase "non-transitory" to overcome the ineligibility determination. *Id.*

Contrary to Red Hat's contention, however, this memorandum does not create a presumption that the claim term "computer-readable recording medium storing instructions" in claim 8 reads on transitory media. Nor does it provide the plain and ordinary meaning of CRM. Where, as here, the intrinsic record demonstrates that the term computer-readable recording medium storing instructions (or the like) does not reasonably include transitory media and the specification's examples are all non-transitory, we will not require the addition of the words "non-transitory" in the claims or specification.[4]

In sum, the limitation "computer-readable recording medium storing instructions"—read in the context of this patent—does not encompass transitory media. We are left with a definite and firm conviction that the district court erred in relying on extrinsic evidence that was clearly at odds with the intrinsic evidence. Thus, we disagree with the district court's claim construction and, consequently, reverse the district court's holding that claims 8–10 are ineligible under § 101.

II

We turn next to the terms "disk partition" and "logical volume." At issue is whether the claimed invention can allocate less than an entire disk partition to a logical volume.

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[4]   Red Hat also relies on district court and U.S. Patent and Trademark Office decisions to support its position that the term "computer-readable recording medium" includes transitory media. *See* Appellees' Br. 72, 75. These non-binding decisions do not impact our holding.

We conclude that it cannot. The intrinsic evidence supports constructing a logical volume using only entire disk partitions.

We again begin with the claim language. *See Personalized Media Commc'ns*, 952 F.3d at 1340. The language of the relevant claims recites "creating the logical volume by gathering disk partitions." '436 patent col. 12 l. 20 (claim 1), col. 13 l. 33 (claim 8). In addition, the claims repeatedly identify "disk partitions" as the construction unit for a logical volume—i.e., "forming the logical volume." *See id.*; *see also id.* at col. 12 ll. 24–25 ("disk partitions forming the logical volume"); *id.* at col. 12 ll. 51 (same); *id.* at col. 13 ll. 37–38 (same). The claims do not recite extents or groups of extents as forming the logical volume. Sequoia argues otherwise because the claims do not include the word "whole" in front of "disk partition." Appellant's Br. 30. But neither do they include the words "parts" or "portions." Appellees' Br. 30; *see* J.A. 1098 (Sequoia admitting "portion of a partition" appears nowhere in the intrinsic evidence). This claim language thus more reasonably suggests that the logical volume is constructed by disk partitions, not portions of disk partitions.

The specification further supports this construction. We have explained that a patent's express purpose of the invention "informs the proper construction of claim terms." *Kaken Pharm. Co. v. Iancu*, 952 F.3d 1346, 1352 (Fed. Cir. 2020). Here, an expressed purpose of the invention is minimizing metadata.[5] *See, e.g.*, *id.* at col. 1 ll. 10–12, col. 4

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[5] The patent's other expressed purpose is dynamic resizing. *See, e.g.*, '436 patent col. 1 ll. 10–12. "By providing flexibility of mapping, volume size can be dynamically increas[ed] and decreas[ed] effectively[.]" *Id.* at col. 4 ll. 47–49. Sequoia argues that if only entire disk partitions form logical volumes, that would reduce flexibility and run afoul of the patent's stated purpose. *See* Appellant's

ll. 7–10. To achieve this goal, the specification explains that "[t]he present invention constructs a logical volume by using a disk partition as a volume construction unit so the present invention can minimize the size of metadata." *Id.* at col. 11 l. 66–col. 12 l. 1. Sequoia argues that metadata is minimized even if portions of the disk partition are used to construct logical volumes. Appellant's Br. 36. But Sequoia's argument is untethered to the language of the patent. The only explanation in the patent for how metadata is minimized is the quoted language above, which credits constructing logical volumes with disk partitions, not portions of disk partitions.

Further, the specification explains that the preferred embodiment requires that "[t]he disk partition is a minimum unit of the logical volume." '436 patent col. 6 ll. 60–61. Also, it states that "the logical volume is resized in disk partition units"; "[t]he logical volume is a union of disk partitions"; and "a logical volume is constructed with several disk partitions." *Id.* at col. 6 ll. 63–65, col. 7 ll. 8–9. We are mindful to not limit claims to a preferred embodiment. *See Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002). But we also recognize that "[a] claim construction exclud[ing] a preferred embodiment is rarely, if ever correct." *Kaufman v. Microsoft Corp.*, 34 F.4th 1360, 1372 (Fed. Cir. 2022) (cleaned up). Here, we do not limit the claim language based on the preferred embodiment. Instead, we recognize that it aligns with, and

Br. 35–36. For support, Sequoia cites to a portion of its expert's report, which is devoid of explanation. *Id.* (citing J.A. 1464–65, ¶ 36). The district court did rely on this extrinsic evidence, *see Decision*, 2021 WL 2010448, at *3, and, in any event, conclusory expert testimony suggesting that dynamic resizing cannot be accomplished with disk partitions is inconsistent with the preferred embodiment, which only resizes based on disk partitions.

thus bolsters, what the plain claim language indicates: that the disk partition is a logical volume's minimum construction unit.

We next turn to the prosecution history, which can inform how the inventor understood the invention and whether the inventor limited the invention during prosecution, thereby clarifying the scope of a claim. *See Phillips*, 415 F.3d at 1317. In *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1362 (Fed. Cir. 2017), we held that "statements made by a patent owner during an IPR proceeding, whether before or after an institution decision, can be considered for claim construction." *See also CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1384 (Fed. Cir. 2022). Here, statements by the patent owner, ETRI, further support a construction of disk partition as a logical volume's smallest construction unit.

In its preliminary response to Red Hat's IPR petition, ETRI distinguished two prior art references, Bridge and Williams, by highlighting that instead of disk partitions, "extents in Bridge or physical partitions in Williams, both *subsets of disk drives*[,] . . . are gathered to form a logical volume." J.A. 1027 (quoting D.I. 178, Ex. K, at 2); *see* J.A. 936 (similarly explaining that "the extents of Bridge or the physical partitions of Williams," not disk partitions, are gathered to form the logical volume). Separately, ETRI stated that "[w]hile the logical volume [in the '436 patent] is formed from extents, extents are added or removed from the logical volume *at the level of the disk partitions*." J.A. 921 (emphasis added). These statements are consistent with the understanding that a logical volume in the present invention is only constructed at the level of disk partitions, not sub-portions of disk partitions.

Sequoia disagrees. It argues that the distinction ETRI drew between the prior art and the claimed invention was that Bridges and Williams lack *any* disk partitions (a necessary component of the claim). Appellant's Br. 38–40. We

disagree. ETRI's statements during prosecution distinguish the prior art based on what element is removed or added to form the logical volume—either disk partitions or *subparts* of disk partitions. Sequoia argues that ETRI's second statement above is consistent with "permit[ting] extents to be individually allocated (or not) to the logical volume." *Id.* at 38. But ETRI's reference to removing or adding extents "at the level of the disk partitions" is clear. *See* J.A. 921. It does not reasonably support a construction that would allow extents—which are sub-portions of disk partitions—to build logical volumes.

Finally, Sequoia argues that another limitation in claim 1, directed to an "extent allocation table for indicating whether each extent in the disk is used or not used," supports its construction of disk partition and logical volume. Appellant's Br. 27–29. According to Sequoia, "used or not used" in the extent allocation table means used or not used for constructing the logical volume. Accordingly, if Sequoia is correct, then extents—not partitions—are the minimum unit forming the logical volume, and the district court's construction of "disk partition" and "logical volume" are incorrect. Red Hat, on the other hand, contends that "used or not used" means used or not used for storage. As such, under Red Hat's construction, this claim language does not undermine the district court's construction of "disk partition" and "logical volume."

The claim language read in isolation does not clearly support either parties' construction. Rather, the plain language of the claim limitation "used or not used" begs the question—used for what? Here, in light of the intrinsic evidence that logical volumes are constructed from entire disk partitions, the extent allocation table must point to whether extents are used or not used for storage. The specification in other respects also sheds some light on the term. It discloses that, in the preferred embodiment, "[t]he disk partition is a minimum unit of the logical volume"; yet, the preferred embodiment also has an "extent allocation

table." *See* '436 patent col. 6 ll. 60–61, col. 12 ll. 42–43. This suggests that "used" does not mean used in the logical volume; rather, it means used for storage. Were it otherwise, the extent allocation table in the preferred embodiment would be superfluous.[6] While not dispositive, we find it unlikely that an inventor would define an invention such that an element of a preferred embodiment is superfluous. *Cf. Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (explaining that interpreting a claim such that a preferred embodiment is excluded is "rarely, if ever, correct" because it is unlikely an inventor would define the invention in such a way).

The district court also relied on a paper written by the inventors of the '436 patent (and cited in the '436 patent) to support its understanding of "used or not used." *See* Kim, et al., *Volume Management in SAN Environment*, PROC. OF THE EIGHTH INT'L CONF. ON PARALLEL AND DISTRIBUTED SYS., 500, 500–05 (2001). We have held that when a patentee cites prior art, it may "have particular value as a guide to the proper construction of the term, because it may indicate . . . that the patentee intended to adopt that meaning." *Arthur A. Collins, Inc. v. N. Telecom Ltd.*, 216 F.3d 1042, 1045 (Fed. Cir. 2000). Here, neither party disputes that the inventors' paper, albeit directed to an earlier system, indicates that an extent is "used" when it is storing information—either storing normal data (as indicated by the value 11) or metadata (as indicated by the values 01 or 10). *See* Appellant's Br. 24–26; Appellees'

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[6]   The preferred embodiment uses "one bit per each extent in *the* disk partition and [the extent allocation map] represents usage of a corresponding extent." '436 patent col. 7 ll. 65–67 (emphasis added). Thus, extents are allocated to a single disk partition. If "usage" means allocation, then the extent allocation table would nonsensically record the same value for each extent.

Br. 67; Reply Br. 10. An extent is "not used" when it is not storing data (indicated by the value 00). The paper explains:

> An extent may be used for both normal data and metadata. The SANtopia [system, an earlier embodiment of the patent's claims] gives two bits to the allocation bitmap for an extent in order to distinguish these usages of an extent. The value 00 is given to an extent for the free space, 01 is for an inode, 10 is for a directory entry and 11 is for a data extent.

J.A. 796. The district court reasonably found that this description is consistent with Red Hat's proposed construction, in that it "indicate[s] that 'an extent is "used" when it is storing information.'" *Decision*, 2021 WL 2010448, at *1 (quoting *Report*, 2020 WL 5835129, at *10).

Sequoia challenges the district court's reliance on this paper, stressing the differences between the present invention and the SANtopia system, and explaining that "a patentee does not renounce the ordinary meaning of a term merely by submitting a reference that employs a different meaning." Appellant's Br. 24–27 (quoting *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1347 (Fed. Cir. 2003)). We agree that the claimed invention and the SANtopia system differ. We also agree that the paper does not dictate the meaning of "usage." Instead, like the district court, we simply conclude that the paper shows that an extent's "use" can refer to its use for storage, rather than its use in constructing a logical volume. In other words, this paper aligns with the specification because it supports interpreting an extent's usage as usage for storage.

In sum, we agree with the district court's claim constructions for "disk partition" and "logical volume." We thus affirm the district court's determination of noninfringement.

CONCLUSION

We have considered the parties' remaining arguments and find them unpersuasive. For the reasons above, we disagree with the district court's construction of "computer-readable recording medium," and we thereby reverse the district court's judgment that claims 8–10 are ineligible under § 101. In addition, because we agree with the district court's construction of "disk partition" and "logical volume," we affirm the district court's judgment of noninfringement.

REVERSED-IN-PART, AFFIRMED-IN-PART

COSTS

No costs.