Trials@uspto.gov
571-272-7822

Paper No. 31
Entered: March 6, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC. and
BLIZZARD ENTERTAINMENT, INC.,
Petitioner,

v.

AC TECHNOLOGIES S.A.,
Patent Owner.

Case IPR2015-01804
Patent 8,656,125 B2

Before MATTHEW R. CLEMENTS, PETER P. CHEN, and JEFFREY W. ABRAHAM, *Administrative Patent Judges.*

ABRAHAM, *Administrative Patent Judge.*

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

I. INTRODUCTION

Amazon.com, Inc., and Blizzard Entertainment, Inc., (collectively, "Petitioner") filed a Petition seeking *inter partes* review of claims 1–14 of U.S. Patent No. 8,656,125 B2 (Ex. 1003, "the '125 patent"). Paper 1 ("Pet."). AC Technologies S.A. ("Patent Owner") filed a Patent Owner Preliminary Response to the Petition. Paper 8 ("Prelim. Resp."). On March 8, 2016, we instituted an *inter partes* review of claims 1–14. Paper 10 ("Dec. on Inst.").

After institution, Patent Owner filed a Patent Owner Response (Paper 16, "PO Resp."), and Petitioner filed a Reply (Paper 20, "Reply"). A consolidated oral hearing for this case and related Cases IPR2015-01801, IPR2015-01802, IPR2015-01803, and IPR2015-01805 was held on December 5, 2016, and a transcript of the hearing has been entered into the record of the proceeding as Paper 30 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–14 are unpatentable.

II. BACKGROUND

A. Related Proceedings

The '125 patent issued from Application No. 13/029,267, which was a continuation of Application No. 11/188,025, now issued as U.S. Patent No. 7,904,680 B2 (Ex. 1002, "the '680 patent"), which was itself a continuation of Application No. 09/903,431, issued as U.S. Patent No. 7,008,084 B2 and reissued as US RE40,521 E (Ex. 1001, "the '521 patent").

The parties identify the following currently pending *inter partes* reviews: Case IPR2015-01805, also pertaining to the '125 patent, Case IPR2015-01801 pertaining to the claims of the '521 patent, and Cases IPR2015-01802 and IPR2015-01803 pertaining to the claims of the '680 patent. Pet. 3; Paper 7, 3.

The parties also identify several pending and previously filed lawsuits brought by Patent Owner and Via Vadis, LLC, in district court, in which the '125, '680, and '521 patents are being asserted, two of which involve Petitioner: *Via Vadis LLC, v. Amazon.com, Inc.*, 1:14-cv-813 (W.D. Tex. 2014) and *Via Vadis, LLC, v. Blizzard Entertainment, Inc.*, 1:14-cv-810 (W.D. Tex. 2014). Pet. 1–2; Paper 7, 2–3.

B. The '125 Patent

The '125 patent relates generally to a data access and management system as well as to a method for data access and data management for a computer system. Ex. 1003, 1:26–28. In particular, it relates to a system and a method for optimizing the access to data and the processing of that data in distributed and networked computer structures. *Id.* at 1:28–31. According to the '125 patent, conventional distributed systems built on the client/server model were vulnerable to failure of the server, failure of network areas connecting the server to the clients, and different "lags" between the server and various clients. *Id.* at 1:33–2:2.

To address these and other problems, the '125 patent describes a distributed system in which data is stored in a redundant manner depending on parameters of data transmission between computer units and data storage means, and the computer units access one of the data storage means as a

function of the data transmission parameters. *Id.* at 2:29–36. Figure 2 is reproduced below.

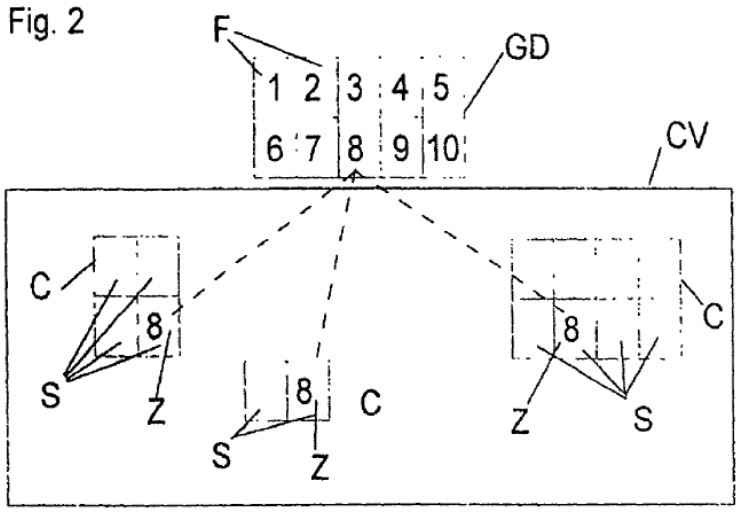

Figure 2 shows a schematic representation of a data structure and its division and assignment to cells. *Id.* at 6:65–67. Data quantity GD is divided into individual data subsets referred to as fields F. *Id.* at 7:13–15. A single field F is stored in several cells Z in a redundant manner. *Id.* at 8:14–15. A cluster C comprises one or more cells Z. *Id.* at 7:25–26. Each memory location of a cluster is referred to as a slot S. *Id.* at 7:58–59. All clusters C are combined for the representation of GD to form a cluster compound CV. *Id.* at 7:30–32.

Figure 1 is shown below.

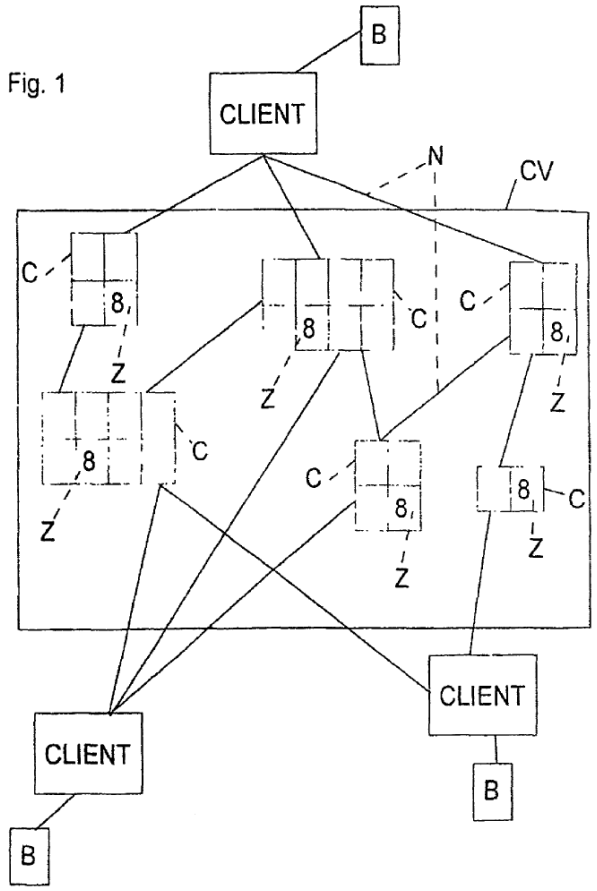

Figure 1 shows a schematic representation of a preferred embodiment. *Id.* at 6:62–64. Figure 1 depicts clients CL connected to clusters C via network N. *Id.* at 7:65–8:10. User B connects to a client CL generally through only one connection, which, according to the '125 patent, is usually a telephone line. *Id.* at 9:67–10:4. The system can be used to provide computer games over the Internet. *Id.* at 3:64–4:3, 9:61–64.

C. Illustrative Claim

Petitioner challenges claims 1–14 of the '125 patent. Independent claim 1 is illustrative, and is reproduced below:

> 1. A non-transitory computer program product for causing a data storage device to copy data over a network by receiving data from or sending data to at least one of a

> plurality of data storage devices in which data is stored redundantly as a function of measured data transmission performance between at least one computer unit that stores at least one complete file of data, each file including a plurality of individual pieces of data, the pieces containing parts of the file, and the plurality of data storage devices, the computer program product comprising a non-transitory computer-readable medium storing computer-readable program code, the computer-readable program code comprising:
>
> a set of instructions for receiving, in the at least one data storage device, at least one piece of data stored by a computer unit in a redundant manner in at least two data storage devices as a function of a measured data transmission performance between the at least one data storage device and the at least one computer unit;
>
> a set of instructions for storing, in the at least one data storage device, the received piece of data;
>
> a set of instructions for measuring, by the at least one data storage device, a data transmission performance between the at least one data storage device and another one of the plurality of data storage devices; and
>
> a set of instructions for sending, from the at least one data storage device to the another data storage device, a copy of the received piece of data for redundant storage as a function of the measured data transmission performance between the data storage devices and independently of an access of the at least one computer unit.

Ex. 1003, 27:25–54. Independent claim 8 is substantially similar to claim 1, but additionally requires that the computer program product operates "a network over which a plurality of data storage devices copy data . . . said network comprising a transmission medium enabling transmission of the

data" and "a set of instruction for providing access by a user of at least one data storage device to the transmission medium." *Id*. at 28:34–67. The dependent claims of the '125 patent recite further requirements of the computer program product, regarding the amount of data stored (claims 2, 3, 9, 10) or the predetermined parameters for data transmissions (claims 4–7, 11–14).

D. The Instituted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Reference	Statutory Basis	Claims Challenged
Rabinovich[1]	§ 103	1–14
Rabinovich	§ 102	1–14

III. ANALYSIS

A. Claim Construction

We interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee,* 136 S. Ct. 2131, 2142–46 (2016). In applying a broadest reasonable construction, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

[1] Michael Rabinovich et al., *Dynamic Replication on the Internet*, Work Project No. 3116-17-7006, AT&T Labs Research (1998) ("Rabinovich," Ex. 1006).

Petitioner proposes constructions under a broadest reasonable interpretation for "data storage device," "computer unit," and "data transmission performance"/"predetermined parameters." Pet. 18–22. In our Decision on Institution, we construed the terms "computer unit," and "data transmission performance"/"predetermined parameters." Dec. on Inst. 8–13. In that Decision, we determined that "computer unit" is not limited to a client computer and, instead, encompasses any computing device. *Id.* at 8–10. We also determined that "data transmission performance" means "any desired parameter of data transmission performance that is suitable for the application of the invention," that "predetermined parameters" and "data transmission performance" are related terms, but not the same, and that predetermined parameters refers to parameters that are determined in advance of their use and application for the claimed purposes. *Id.* at 11–13.

Neither party contested or addressed our construction of these terms. Nor did any party address our decision that no other terms required construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy."). We see no reason to modify our prior determination in light of the record developed at trial.

In addition, we find it necessary to construe the term "pieces" in order to resolve the disputes between the parties.

"pieces"

Claim 1 recites "each file including a plurality of individual pieces, the pieces containing parts of the files." Ex. 1002, 25:67–26:1. The other independent claims recite limitations commensurate in scope. Neither party

proposes explicitly a construction of the term "piece." Petitioner argues that "files are inherently composed of pieces in the form of bits that make up bytes, the bytes themselves being pieces of the file." Pet. 29. Patent Owner argues that construing "piece" to cover "bits and bytes" of a file "would read out the 'pieces' limitation from the claim entirely" (PO Resp. 25) and that "one of ordinary skill would not read the 'pieces' limitation of the claim to include bits and bytes" (*id.* at 26).

The claims themselves define "piece" by requiring that a "file" have a "plurality of individual pieces," but do not establish a lower bound—i.e., a minimum number of bits or bytes—to qualify as a "piece." Patent Owner identifies no support in the '125 patent for its contention that "piece" or "pieces" excludes a byte or bytes of a file, relying instead solely on the testimony of Dr. Paul S. Jacobs. *Id.* (citing Ex. 2006 ¶¶ 38–39). We are not persuaded by Dr. Jacobs's conclusory testimony. Because "piece" and "pieces" are limited by the claims only to being a subset of a file and because a byte or collection of bytes of a file is a subset of that file, we are persuaded that the broadest reasonable interpretation of "piece" and "pieces" in light of the Specification of the '125 patent encompasses a byte or bytes.

B. Principles of Law

To prevail in this *inter partes* review of the challenged claims, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

To establish anticipation, a party must show by a preponderance of the evidence that a prior art reference expressly or inherently describes each claim limitation arranged as in the claim said to be anticipated. *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334–35 (Fed. Cir. 2008), as

further amplified by *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

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 skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We analyze the instituted ground of unpatentability in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner's declarant, Dr. Ratner, testifies that a person of ordinary skill in the art at the time of the alleged invention "would have had an undergraduate degree in Computer Science or a related field, such as Electrical Engineering, and two to three years of experience working in the field, or an equivalent level of experience." Ex. 1005 ¶ 17; Pet. 17–18. Patent Owner does not challenge this definition or present its own.

Accordingly, we credit the testimony of Dr. Ratner regarding the level of ordinary skill in the art, and find that a person of ordinary skill in the art would have had an undergraduate degree in Computer Science or a related field, such as Electrical Engineering, and two to three years of experience working in the field, or an equivalent level of experience. This level of

ordinary skill is reflected not only by the information presented by the parties, but also by the prior art of record. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art itself can reflect the appropriate level of ordinary skill in the art).

D. Whether Rabinovich is a Printed Publication

In the Decision on Institution, we determined that for the preliminary stage of this proceeding, Petitioner had shown Rabinovich to be a printed publication. Dec. on Inst. 13–18. We noted:

> Here, Petitioner presents testimony from Dr. Rabinovich that indicates Rabinovich was posted to a specific URL no later than December 1998, which is more than one year before the earliest priority date (January 11, 2000) of the '125 patent. Ex. 1004 ¶¶ 2, 4, 6, 8. Dr. Rabinovich testifies that he authored an article that was published in the December 1998 IEEE Bulletin, cited Rabinovich in footnote 16 of that article, and included the URL on his webpage from which the general public could download Rabinovich. *Id.* Petitioner provides a copy of Dr. Rabinovich's article published in the December 1998 IEEE Bulletin as Exhibit 1011, which includes a citation to Rabinovich in footnote 16, and states that the article is available at a specific URL. Ex. 1011, 13 n. 16. Dr. Rabinovich further testifies that his practice was, "for each cited article identified as being available on my website at a specific URL, [to] confirm the cited article's actual availability at that URL." Ex. 1004 ¶ 6.
>
> Our review of the evidence on the present record, including the footnote in the December 1998 IEEE Bulletin article and Dr. Rabinovich's testimony, indicates that, at this stage, Petitioner has shown sufficiently that Rabinovich was publicly accessible to one of ordinary skill in the art as of December 1998. In particular, the fact that the 1998 IEEE Bulletin article expressly cites Rabinovich in footnote 16, which indicates that Rabinovich is a technical report from AT&T labs and is available at a specific URL, suggests that a person of ordinary skill in the art interested in the subject matter

> at issue, exercising reasonable diligence, could have located Rabinovich. *See Blue Calypso, LLC. v. Groupon, Inc.*, No. 2015-1391, -1393, -1394, slip op. at 32 (Fed. Cir. March 1, 2016).

Id. at 16–17 (footnote omitted).

In the Patent Owner Response, Patent Owner discusses *Cornell Univ. v. Hewlett-Packard Co.*, No. 01-cv-1974, 2008 U.S. Dist. LEXIS 39343 (N.D.N.Y. May 14, 2008). PO Resp. 33–35. According to Patent Owner,

> [i]n [*Cornell*], the case cited by the Federal Circuit to suggest an article is prior art because another article cited to it, the Court found a published article's in-context citation to a master's thesis supported a finding that the master's thesis was prior art – and the context was critical. In particular, there was no dispute in *Cornell* that the master's thesis, while unpublished, could be found in the university's collections.

Id. at 33–34. Patent Owner argues that, unlike in *Cornell*, there is no evidence in the present record demonstrating that Rabinovich was ever available on Dr. Rabinovich's personal website. *Id.* Patent Owner further argues that in *Cornell*, the disputed prior art reference "set forth the common subject matter between" the patent at issue and the disputed reference, whereas "the IEEE publication at issue here provides no such context" for common subject matter of the challenged patent and the alleged publication. *Id.* at 34–35. Patent Owner asserts, "because the IEEE article cites Rabinovich in the context of algorithms unrelated to the patented subject matter, it would cause a [person of ordinary skill in the art] to ignore Rabinovich – not to seek it out. . . . The IEEE article is not a research aid that would guide someone to Rabinovich." *Id.* at 35.

In its Reply, Petitioner contends:

> Dr. Rabinovich's testimony establishes that Rabinovich was publicly available at least by December 1998. Dr. Rabinovich's

> consistent, professional practice was to personally re-publish his AT&T technical memoranda on the webpage that he managed on AT&T's publicly accessible website whenever he cited to those memoranda in later publications. (Ex. 1004 at ¶¶ 2, 6, 8; Ex. 2004 at 5:5-9:25.).
> . . .
>
> Patent Owner argues a [person having ordinary skill in the art] would not have located Rabinovich because Rabinovich and the December 1998 Article relate to data replication instead of segmented file transfer. This argument is based upon a mischaracterization of the invention and additionally fails because the scope of relevant prior art not limited to the solution reached by the inventor.

Reply 19–20.

Petitioner also argues that in *Cornell* the unpublished Master's thesis was ruled prior art because it was cited in an IEEE article circulated to many researchers in the relevant field and the IEEE article acted as a "road map" in setting forth the common subject matter between the patent at issue and the Master's thesis in a way that would "guide a person of ordinary skill interested in the subject matter" to the thesis. *Id.* at 21. Petitioner contends the December 1998 IEEE article serves as such a roadmap to Rabinovich:

> The 1998 Article was published in a "Special Issue on Data Replication" of the IEEE Bulletin focusing on "technique[s] for ensuring high availability … and performance of distributed database systems," "fault tolerance," and "synchronization mechanisms." (Ex. 1011 (December 1998 Article) at cover, 1-2.) The December 1998 Article itself "examines issues that arise in Web content replication, paying special attention to challenges in dynamic replication." (*Id*. at 21.) Most importantly, the passage in the December 1998 Article that cites to Rabinovich identifies an algorithm in Rabinovich ("[fn16]") for optimizing access to data using the rank of replicated data combined with the proximity of the replicated data in order to increase performance. (*Id*. at 26.) Footnote 16 contains the

> URL to Rabinovich. Thus, the December 1998 Article provided a roadmap directing persons of interest, such as the IEEE members to whom the Bulletin was distributed, to Rabinovich.

Reply 21–22.

We agree with and adopt Petitioner's reasoning and determine Rabinovich to be a printed publication. We credit the unrebutted testimony of Dr. Rabinovich regarding the consistency of his professional practice in 1998 for republication of his AT&T technical memoranda on a webpage that he managed on AT&T's publicly accessible website. Furthermore, we find the December 1998 IEEE article corroborates the public availability of Rabinovich on that website, and would have been a roadmap, for one of ordinary skill in the art of data management and optimized access to data, to be guided to Rabinovich. *See* Reply 19. As Petitioner points out, Patent Owner's own declarant states that Rabinovich and the December 1988 IEEE article "are 'similar[]' in that they both address 'problems in network connectivity caused by multiple clients accessing servers.' (Ex. 2006 at 12)." *Id.* at 20. Additionally, the passage in the December 1998 IEEE article that cites to Rabinovich refers to an algorithm in Rabinovich for optimizing access to data in order to increase performance. *Id.* Accordingly, we find that footnote 16 of the IEEE article, which contains the URL to Rabinovich, would have guided one of ordinary skill directly to Rabinovich.

We are, therefore, persuaded, that Rabinovich is a printed publication under 35 U.S.C. § 102.

E. Claims 1–14 — Obviousness over Rabinovich

1. Rabinovich (Ex. 1006)

Rabinovich describes:

> a protocol suite for dynamic replication and migration of Internet objects. It consists of an algorithm for deciding on the number and location of object replicas and an algorithm for distributing requests among currently available object replicas. Our approach attempts to place replicas in the vicinity of a majority of requests while ensuring at the same time that no servers be overloaded. The request distribution algorithm uses the same simple mechanism to take into account both server proximity and load, without actually knowing the latter. The replica placement algorithm executes autonomously on each node, without the knowledge of other object replicas in the system.

Ex. 1006, 1.

2. The Parties' Positions

Petitioner argues that the subject matter of claims 1–14 would have been obvious in view of Rabinovich. Pet. 28–38. For this argument, Petitioner takes the position that Rabinovich's clients read on the claimed "computer units," and that the "objects" disclosed in Rabinovich correspond to the recited "file[s] of data," and are stored, replicated, and served to clients. *Id.* at 28–29.

Patent Owner argues, *inter alia,* that Petitioner has not shown that Rabinovich teaches transfer and storage of pieces of data between data storage units "*independently of an access of a computer unit,*" as required by independent claims 1 and 8. PO Resp. 18.

Independent claim 1 recites, in relevant part:

> a set of instructions for sending, from the at least one data storage device to the another data storage device, a copy of the

> received piece of data for redundant storage as a function of the measured data transmission performance between the data storage devices and independently of an access of the at least one computer unit.

Ex. 1003, 27:49–54. Independent claim 8 likewise requires:

> a set of instructions for providing access by a user of at least one data storage device to the transmission medium for:
>
> . . .
>
> (iv) sending . . . a copy of the received piece of data for redundant storage as a function of the measured data transmission performance between the data storage devices and independently of an access of the computer unit.

Id. at 28:48–67.

Petitioner contends that Rabinovich discloses instructions for sending data from one host/server (i.e., a data storage device) to another based on measured data transmission performance between the two devices. Pet. 32. According to Petitioner, the pseudocode "Loop through *candidates*(x_s), in decreasing order of *dist*(E,x_s)" indicates that the replication decision is "based upon distance away from the host, which Rabinovich discloses correlates with communication costs/delay." *Id.* (citing Ex. 1006, 5, 12, Fig. 4). Petitioner further argues that Rabinovich's algorithm evaluates each candidate host based on its "count ratio" or "count-affinity ratio," which Petitioner alleges are proxies for the load on the candidate hosts. *Id.* If a host is selected, "a ReplicateRequest is issued, which causes copying depending on the load of the candidate host." *Id.* (citing Ex. 1006, 14, Fig. 5).

Petitioner also argues that Rabinovich discloses a set of instructions for replicating data "independently of an access by a client at that time and

without contacting the clients." *Id.* (quoting Ex. 1006, 2) (citing Ex. 1006, 12, 14, Figs. 4, 5).

As to the meaning of "independently of an access," Petitioner argues the '125 patent describes two ways in which the copying is done "independently" of an access by the computer unit. First, the '125 patent "identifies no role for the client computer" when a storage host periodically checks its past transmission performance metrics to decide whether to copy data to a new host, or when data is actually copied from one storage device to another. Reply 9–10. Second, according to Petitioner, "[c]opying is not initiated as a result of specific access requests from the computer unit." *Id.* at 10; Tr. 13:18–20.

In view of this, Petitioner argues that a storage device can copy "independently of an access" even if its decision to copy or its decision where to copy is based, in part, on data transmission performance measurements made during, or based on, prior access by the computer unit. Tr. 9:19–23, 11:6–12 ("[R]elying upon past communications with the client is not making it dependent upon an access of the computer unit, because . . . the data storage units . . . check their parameters periodically. And they decide whether to move the data . . . independent of any involvement of the computer unit."). Petitioner asserts that any other outcome would conflict with the teachings in the '125 patent because the purpose of the '125 patent is for data storage devices to quickly and reliably service client data requests, and that the system of the '125 patent does this by "tak[ing] into account transmission parameters from prior accesses in order to determine when and where to shift data." Reply 12.

Petitioner further argues that "[i]f copying decisions based on measured transmission data do not qualify as being made 'independently of an access' by the computer unit, then there is no disclosure in the patent of independent copying." *Id.* at 11, 14 ("[T]here is no disclosure in the '125 Patent of any technique for shifting data from one storage device to another based on 'data transmission parameters' other than those collected during prior requests for the data from a computer unit."); Tr. 12:19–24 (arguing that "independent of an access" does not exclude reviewing parameters related to past communications with clients because that would be contrary to the purpose of the patent).

Petitioner also argues that Rabinovich replicates data "independently of an access of a computer unit" in the same manner as the '125 patent. Reply 12–15. Petitioner contends that replication is performed "periodically" by a storage host and is not initiated in response to any specific access request for data by a computer unit. *Id.* at 12–13. Petitioner acknowledges that Rabinovich uses a count of prior accesses from the client, but notes that "it doesn't take a count to trigger this." Tr. 14:22–23. Rather, "it's possible that the count might not have changed at all since . . . you've run this algorithm. The count hasn't changed. There's been no new accesses." *Id.* at 14:16–19. Petitioner also contends that Rabinovich uses data parameters that are similar or identical to those used by the '125 patent when determining whether and where to replicate data, and that Rabinovich, like the '125 patent, updates the data transmission parameters for each storage device as the requests are received. Reply 13–14.

Patent Owner argues that "independently of an access" means that "the data storage units cannot consider any access from the computer unit."

Tr. 33:14–16. Patent Owner contends that the host in Rabinovich "explicitly takes into account access by the clients" in its replication step. PO Resp. 29 (emphasis omitted). According to Patent Owner, Rabinovich discloses that a host will replicate an object only when the number of accesses of that object by the client exceeds a certain threshold. *Id.* Specifically, Patent Owner contends that hosts record accesses by the client as $cnt(s,x_s)$, and that Rabinovich's replication step proceeds only if the ratio of $cnt(s,x_s)$ to $aff(x_s)$ is greater than a threshold value m. *Id.* at 29–30. At the Hearing, counsel for Patent Owner stated:

> the Rabinovich algorithm only performs the replication and copying step if the access count here is non zero. This is pointed out directly in Rabinovich's algorithm. Even though the algorithm itself is run periodically, the first step of the algorithm checks to see if the access count is divided by the affinity is less than the threshold. If the access count is zero, that's certainly less. . . . So the replication is . . . not performed.

Tr. 34:17–35:5; *see also id.* at 38:8–12 (arguing that "if the only way this [copy operation] is going to be triggered is a situation where a computer unit conducts an access, then there is a dependency on the access for the copy operation"), 41:8–13 (arguing that copying in Rabinovich occurs only "when a computer unit conducts an access and turns the count to a non zero number").

Patent Owner argues that Petitioner's contention that Rabinovich's hosts copy "independently of an access" because a replica is made "independently of an access by a client *at that time and without contacting the clients*" attempts to read additional limitations into the claim language. PO Resp. 30. According to Patent Owner, even though Rabinovich's replication occurs *after* the client accesses the object, the decision to

replicate still "depends" on the client access. *Id.* at 30–31 ("Essentially, Rabinovich teaches the hosts record the accesses made by the clients and use the recorded number of accesses to control replication, which is dependent of access.").

3. Analysis

There is no dispute that Rabinovich's algorithm for replication considers the parameter $cnt(s,x_s)$ in determining whether to replicate data object x_s. Rabinovich defines $cnt(s,x_s)$ as the "total access count for x_s," which is equal to $cnt(x_s)$. Ex. 1006, 11. According to Dr. Ratner, "[t]he metric $cnt(s, x_s)$ measures the total number of times in that window that replica x_s has been served to a client computer." Ex. 1005 ¶ 253. As Patent Owner points out, Rabinovich teaches replicating object x_s only if the ratio of $cnt(s,x_s)$ to $aff(x_s)$ is greater than m, and the ratio can be greater than m only if $cnt(s,x_s)$ is greater than zero. PO Resp. 29; Ex. 1006, 12, Fig. 4. In view of this, we agree with Patent Owner that if $cnt(s,x_s)$ has a value of zero, meaning that object x has not been served to any client computer, then the ratio of $cnt(s,x_s)$ to $aff(x_s)$ will be zero, i.e., less than m, and Rabinovich will not carry out its replication step. This means that Rabinovich will not replicate object x_s until x_s has been accessed by a client computer at least once, such that the access count for x_s is greater than zero. In this regard, we agree with Patent Owner that object x_s is not "sen[t], from the at least one data storage device to the another data storage device . . . independently of an access of the at least one computer unit" because Rabinovich teaches explicitly that object x_s is not sent unless there has been at least one access from the client computer.

We are not persuaded by Petitioner's argument that Rabinovich replicates data "independently of an access of a computer unit" in the same manner as the '125 patent. Reply 12–15. The '125 patent does not expressly define the phrase "independently of an access of a computer unit." The '125 patent does, however, explain that the data storage means processes stored data independently from the computer unit. *See, e.g.*, Ex. 1003, 2:59–60 ("[I]t is to be preferred that the data storage means process the stored data independently from the computer unit."). The '125 patent also teaches that interactions between the computer unit and data storage units are considered in determining replication of data between data storage devices. For example the '125 patent states:

> All cells Z and/or clusters C and/or clients CL periodically check their applicable parameters for data transmissions. In periodic intervals or subsequently to specified actions, all cells Z and/or clusters C and/or clients CL check the parameters for data transmissions, which are applicable to the used cells Z. If the checked parameters do not meet specified limits, or if other cells Z and/or clusters C comprise better data transmission parameters, the checking cells Z will try to shift its data to these other cells Z and/or clusters C in order to improve the data transmission parameters applicable for this data. In this manner, the inventive cluster compound CV optimises itself automatically during operation with respect to data transmissions.

Id. at 9:16–28. The '125 patent further explains that:

> [i]n order to carry out the data access and the data management in a more efficient manner each cell may comprise additional data which relates to parameters of data transmissions between the individual data storage means and the computer unit, and/ or neighbouring cells, and/or cells which comprise data which is stored in the system in a redundant manner.

Id. at 3:8–14, 5:1–6. Thus, the '125 patent does disclose considering parameters of data transmission between the computer unit and data storage device as part of data replication (shifting) between data storage units.

We, therefore, agree with Petitioner that "independently of an access" can encompass replication that is performed periodically and with no active role for the client computer in deciding whether to copy data or in copying the data itself. We also agree that a storage device can act "independently of an access" even if it considers data transmission performance measurements made during, or based on, prior access by the computer unit. In those respects, Rabinovich's teachings are similar to the teachings of the '125 patent.

Unlike Rabinovich, however, the '125 patent does not require that a parameter of data transmission between a client computer and data storage device, such as an access count, be above a certain threshold before replication can occur. Rather, as noted above, the '125 patent explains that as an alternative to instances where "checked parameters do not meet specified limits," data may be replicated to other data storage units "if other cells Z and/or clusters C comprise better data transmission parameters." Ex. 1003, 9:21–26. Therefore, although Rabinovich's hosts can decide autonomously, i.e., at any time and without contacting a client, when to initiate its replication algorithm, that algorithm will not "send[], from the at least one data storage device to the another data storage device, a copy of the received piece of data," as required by the claims, unless at least one access by a client (i.e., computer unit) has taken place. As a result, despite the similarities between Rabinovich and the '125 patent, Rabinovich's requirement that object x_s have an access count greater than zero before it

will replicate object x_s leads us to conclude that Rabinovich fails to teach instructions for sending data between data storage devices "independently of an access" of the computer unit. We find that this outcome is consistent with the teachings of the '125 patent, despite Petitioner's arguments to the contrary, in view of the disclosure in the '125 patent regarding replicating data based on whether checked parameters do not meet specified limits, or if other cells Z and/or clusters C "comprise better data transmission parameters."

For all of the foregoing reasons, we are not persuaded that Rabinovich discloses a set of instructions for sending data from one storage device to another "independently of an access" of Rabinovich's client.

Therefore, Petitioner, under its obviousness analysis wherein it argues that Rabinovich's client corresponds to the "at least one computer unit," has failed to establish that Rabinovich teaches or suggests all of the limitations of independent claims 1 and 8. Because claims 2–7 depend from claim 1, and claims 9–14 depend from claim 8, we find that Petitioner has failed to demonstrate that Rabinovich teaches or suggests all of the limitations in these claims as well.

F. Claims 1–14 — Anticipation by Rabinovich

Petitioner argues that under a broad construction of "computer unit," wherein any computing device can be a "computer unit," claims 1–14 are unpatentable under 35 U.S.C. § 102 as anticipated by Rabinovich. Pet. 38–48. Petitioner directs us to specific portions of Rabinovich in arguing that Rabinovich discloses all of the limitations of claims 1–14. *Id.*

Patent Owner argues that Petitioner has failed to show that Rabinovich teaches (1) dividing files into pieces of data and then

redundantly storing the pieces and (2) transfer and storage of those pieces of data between data storage units "independently of an access of a computer unit." PO Resp. 9–10, 13–14.

We first address the disputed limitations and then address the undisputed limitations.

1. The Disputed Limitations

i. Pieces

Patent Owner argues that "a key feature of the patent is dividing a complete file into pieces and then redundantly storing *the pieces of the complete file* (as opposed to merely redundantly storing the complete file) (the 'pieces limitation')." PO Resp. 15. According to Patent Owner, the "pieces limitation" is found in every independent claim. *Id.* at 15–16; *see, e.g.*, Ex. 1003, 27:37–39, 49–51 (claim 1 reciting "a set of instructions for receiving . . . at least one piece of data stored by a computer unit in a redundant manner" and "a set of instructions for sending . . . a copy of the received piece of data"). Patent Owner argues that "these **pieces** are subsets of a complete file—and not the complete file itself." PO Resp. 16. Patent Owner contrasts the claims of the '125 patent with claim 30 of related patent U.S. RE40,521E, which recites "**storing <u>data</u>**" rather than pieces. *Id.* at 17.

We agree, and Petitioner does not dispute (Reply 1–2), that a "piece" of a file must be less than the entire file. Claim 1, for example, explicitly recites "one complete file of data, each file including a plurality of individual pieces of data, the pieces containing parts of the file." Because the claim requires a "plurality" of pieces, each "piece" is necessarily a subset of a "file."

As Petitioner points out (Reply 1–2), the independent claims all recite storing "at least" before "one piece," and, therefore, allow for more than one piece, and thus all of the pieces of an entire file, to be "stored in a redundant manner." Thus, the copying limitation also permits copying more than one piece, and thus all of the pieces of an entire file. In fact, Patent Owner does not dispute that the claims are broad enough to cover copying all of the pieces of an entire file. Tr. 51:1–4. As a result, although we agree that a "piece" is less than a complete file, such an interpretation does not distinguish the claims, which recite "*at least* one piece," from what is disclosed by Rabinovich.

Patent Owner contends that because the independent claims of the '125 patent also recite a set of instructions for storing "the received piece of data," the claims require storing the pieces of a complete file separately, as opposed to merely redundantly storing the complete file. PO Resp. 20–21. Patent Owner also argues that because Petitioner does not dispute that "pieces" means something less than the whole, and the claims explicitly recite storing data in "pieces," the claims require storing something less than the whole file. Tr. 52:22–53:3. According to Patent Owner, the claims clearly distinguish between pieces of data and a complete file, and therefore when the claims refer to storing a piece of data, it requires dividing and storing a file in pieces, even when it stores all of the pieces that, when reassembled, would make up a complete file. PO Resp. 24.

Patent Owner argues that "Rabinovich teaches at most that *the file is redundantly stored*, not that *the pieces of the file are redundantly stored* as required by the claims." PO Resp. 19; *see also id.* at 9 (arguing "nowhere in Rabinovich's replica placement algorithm (or anywhere else in Rabinovich)

is there a step that divides an individual Internet object into any pieces *and then redundantly migrates, replicates, or stores the pieces*"). Specifically, Patent Owner argues that "the claims require *the same pieces that are transferred must also be the pieces that are redundantly stored*" (*id.* at 20), and that Rabinovich does not disclose that "the same packets sent over the Internet are also the blocks or fragments stored on a hard drive" (*id.* at 20–21).

Petitioner counters that Rabinovich's objects are broken into "pieces"—i.e., bits, bytes, or collections of bytes—and transmitted in packets to another host that redundantly stores those pieces, and others, to create a replica of the data object. Reply 3 (citing Ex. 1005 ¶¶ 237–241); Tr. 20:23–21:10. Petitioner further points out that "Rabinovich's disclosure of a replication protocol that uses the TCP/IP protocol to transmit a file in pieces to multiple hosts discloses that the same pieces of the file that are transmitted are redundantly stored." Reply 4 (citing Ex. 1005 ¶¶ 237–241). Otherwise, according to Petitioner, "[i]f the pieces were not stored, the hosts would not be able to supply the complete file to clients or other hosts." *Id.*

We agree with Petitioner. Rabinovich's data object cannot be stored at a second host without necessarily storing each "received piece"—i.e., a byte or collection of bytes of that data object—as it is received in the payload of TCP/IP packets. Patent Owner's declarant, Dr. Jacobs, testified that "where one copies a file over the internet, if that copy is perfectly successful, then the bits and bytes of the file in the copy would be identical to the bits and bytes of the original file." Ex. 1020, 43:7–11. This is consistent with Dr. Ratner's testimony that "files are typically stored on storage devices as organized in drive storage blocks or sectors and organized

as bytes. Collectively these pieces make up a file." Ex. 1005 ¶ 237; Tr. 24:19–22.

Furthermore, Patent Owner's arguments are not persuasive because they are not commensurate with the scope of the claims. Specifically, Patent Owner asks us to read into the claims limitations on *how* pieces are stored and sent by arguing, for example, that the claims require "storing something less than the whole file" (Tr. 52:22–53:3). The claims, however, do not recite, for example, "storing . . . the received piece of data *separately from the other pieces of data that complete the file*." The claims also do not recite, for example, "storing . . . the received piece of data *in a way that it can be accessed separately from the file of which it is a piece*." The storing limitation requires only that the received piece of data be stored on a data storage device. The "received piece of data" is "stor[ed]" regardless of the mechanics of how it is stored—e.g., as a block or fragment on a hard drive; as the only piece of that file on that hard drive; as the only piece of that file on that data storage unit; contiguously with other pieces of the same file; in a way that it can be addressed directly by the file system. None of those mechanics are in the claim language and, even if they were in the Specification, which they are not, it would be improper to read them into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Likewise for the "sending" instructions, the claims do not recite, for example, "sending . . . the received piece of data *but not the other pieces of data that complete the file*," "sending *in one packet* . . . the received piece of data," or "sending . . . the received piece of data *by itself*." The sending limitation requires only that a copy of the received piece of data on one data storage device be sent to another data storage device. A copy of the

"received piece of data" is "sen[t]" regardless of the mechanics of *how* it is sent—i.e., as one packet; as more than one packet; or as only part of a packet that also includes other pieces.

Because the claim language does not recite the limitations on *how* pieces are stored and sent that Patent Owner contends, we are persuaded by Petitioner's contentions that the "storing" and "sending" limitations are met by Rabinovich's teaching that objects are broken into "pieces"—i.e., bytes—and transmitted in packets to another host that redundantly stores those pieces, and others, to create a replica of the data object. Pet. 29; Reply 3 (citing Ex. 1005 ¶¶ 237–241); Tr. 20:23–21:10. Petitioner's evidence and arguments establish persuasively that, in Rabinovich, a host (i.e., "at least one data storage unit") receives at least one byte of an object (i.e., "at least one piece of data") in a TCP/IP packet, stores that at least one byte (among others), and sends, during the replication process, a copy of that byte (among others) to another host (i.e., "another data storage unit'). This teaching necessarily implies the existence of instructions for receiving, storing, and copying the at least one byte (i.e., "the received piece of data") because, as Petitioner notes, "[i]f the pieces were not stored, the hosts would not be able to supply the complete file to clients or other hosts." Reply 4.

Patent Owner also argues that "the pieces must already be redundantly stored 'in at least two data storage devices' prior to 'receiving in the at least one data storage device.'" PO Resp. 18–19. Petitioner counters that "[t]he claims do not require the piece of data to already be redundantly stored in the data storage devices before the remainder of the steps of the claim" because "[t]he initial reference in the claim to data being redundantly stored

refers to the redundant storage that happens during the steps of the claim." Reply 5 n.4.

Patent Owner's argument is not persuasive. Claim 1 is a system, not a method, claim. The phrase "at least one piece of data stored by a computer unit in a redundant manner" describes a limitation on the recited "at least one piece"; it does not recite a method step nor imply a sequence of events, order of operations, or other chronological relationship between the recited interaction and the point in time at which a "piece" can be described accurately as "stored in a redundant manner." Because we are not persuaded that the claim language implies a sequence of steps, we also are not persuaded by Patent Owner's conclusion that "it makes no sense to read Rabinovich as teaching the pieces limitation because it would be superfluous to replicate another copy of an Internet object on a host that already has a copy of the Internet object." *Id.* at 18.

Patent Owner next argues that claim 1 requires "a piece of the complete file already exist on the data storage unit (which Petitioners allege is Rabinovich's host), and then copying another piece of the complete file to that host," and that Rabinovich does not teach "copying another copy of the complete file to a host that has already stored a copy of that complete file." PO Resp. 21. Petitioner counters that:

> This argument is based upon two errors. First, the claims recite that "the at least one piece" is redundantly stored in the at least two data storage units, and then the same "the at least one piece" is copied to one of the data storage units. (*See, e.g.*, Ex. 1003 at 27:38-40, 27:50-51.) Thus, if Patent Owner's interpretation were correct—which it is not—the claims would require that a piece of the file already stored in data storage devices be copied to one of the same storage devices. Second, even if the piece of the file had to already be redundantly stored

> and then redundantly stored again, as Patent Owner asserts, the claims do not specify that the second redundant storage would have to be in the same data storage devices. There could be, for example, 10 data storage devices with the piece redundantly stored in just two and then stored in two others.

Reply 4–5 (footnote omitted). We agree with Petitioner. The relevant limitations of claim 1, for example, require only "at least one piece of data stored by a computer unit in a redundant manner in at least two data storage units," and "a set of instructions for storing, in the at least one data storage device, the received piece of data." This claim language does not require, as Patent Owner contends, that the data storage unit to which "pieces" of a file are copied already store another "piece" of the same file. The claims encompass, as Petitioner points out (Reply 5), a hypothetical system with ten "data storage devices," in which case the "at least one piece" could be "redundantly stored in [data storage devices A and B]" and "then stored in [data storage devices C and D]." Nothing in the claims requires data storage devices C and D to be one of the data storage units in which "the at least one piece is stored in a redundant manner." We, therefore, disagree with Patent Owner's contention that "the pieces limitation of the claim [] requires some piece of the complete file to exist in the data storage unit prior to copying other pieces of the complete file to the data storage unit." PO Resp. 22 (emphasis omitted).

Patent Owner also argues that Rabinovich's "objects" are not "pieces" of a complete file (PO Resp. 22–25), but Petitioner replies that "[t]he Board need not decide this issue" because "Petitioners did not rely upon that basis in their Petition. Instead, Petitioners relied upon the TCP/IP protocol transmitting files in pieces and that bits and bytes also constitute pieces of

files" (Reply 5–6). We agree with Petitioner. Because Petitioner's contentions are not based upon Rabinovich's "objects" being "pieces," we need not address this argument by Patent Owner.

Patent Owner also argues that, in our Decision on Institution, we "adopted a third position, that files are inherently comprised of bits and bytes and thus redundantly transferring and storing any file necessarily involves redundantly transferring and storing pieces of the file – the bits and bytes." PO Resp. 25. According to Patent Owner, "[t]his position is not one advanced in Petitioners' expert testimony and is fundamentally inconsistent with what Petitioners actually argued – that the 'pieces' are blocks and packets." *Id.* Petitioner counters that "[t]his argument was a not a creation of the Board," because "Dr. Ratner explained and Petitioners relied upon the fact that files are made up of bits and bytes, and these pieces of the file would be transmitted and stored in the receiving computer." Reply 6 (citing Pet. 32; Ex. 1005 ¶¶ 237, 290). Petitioner is correct. In our Decision on Institution, we stated that:

> Petitioner argues that a person of ordinary skill in the art would understand the 'object' in Rabinovich to include files, such as HTML pages, which are: inherently composed of pieces in the form of bits that make up bytes, the bytes themselves being pieces of the file. . . . [Pet. 29].

Dec. Inst. 20. As is evident on pages 29 and 46 of the Petition, Petitioner articulates clearly that, "files are inherently composed of pieces in the form of bits that make up bytes, the bytes themselves being pieces of the file." Thus, contrary to Patent Owner's characterization, Petitioner identified bytes—not blocks or packets—as the recited "pieces." As a result, we are not persuaded by Patent Owner that we adopted, in our Decision to Institute, a position different from what Petitioner articulated.

In view of the foregoing, we determine that Petitioner has demonstrated by a preponderance of evidence that Rabinovich teaches the "pieces limitations" recited in independent claims 1 and 8.

ii. "independently of an access"

Petitioner contends that under a construction wherein any computing device can be a "computer unit," one of Rabinovich's hosts can be the required "computing unit," and the servers to which that host replicates data can be the recited "data storage units." Pet. 39–40. Petitioner thus argues that Rabinovich's host stores a "complete file" when it stores an "object," and replicates objects to different hosts/servers, which then store that object. *Id.* According to Petitioner, when the sending host (i.e., "computer unit") replicates an object more than once, the data is redundantly stored in the receiving hosts/servers (i.e., "data storage units"). *Id.* at 39–41. Additionally, when one of the receiving hosts/servers replicates data to another host/server, "that would constitute the data storage unit to a data storage unit copying recited in the claims." *Id.* at 39.

As discussed above, claim 1 requires "a set of instructions for sending from the at least one data storage device to the another data storage device, a copy of the received piece of data for redundant storage . . . independently of an access of the at least one computer unit." Petitioner contends that, under a broad construction of "computer unit," such as the one we adopt here, Rabinovich discloses this limitation based on the algorithms set forth in Rabinovich Figures 4 and 5. Reply 7–8. Specifically, Petitioner contends that because the client is no longer considered the "computer unit," the fact that the replication algorithm is dependent on the access of the *client* (i.e., cnt(s,xs)) in Rabinovich is irrelevant to the question of whether replication

occurs independently of an access by the computer unit. *Id.* at 8. Instead, the relevant inquiry is whether the subsequent replication between hosts (i.e., data storage devices) is independent from an access of the host that initially stores, then replicates the data (i.e., the "computer unit"). *Id.* at 7–8. Petitioner argues that Rabinovich satisfies this limitation because the "hosts receiving the data and functioning as data storage devices . . . replicate or migrate the data themselves to other host/data storage devices by periodically checking the access count that keeps track of accesses by clients." *Id.*; Pet. 42–43 (citing Ex. 1006, 2, 12, 14, Figs. 4, 5, and noting that Rabinovich discloses "allow[ing] a host to decide on object migration and replication autonomously.").

Patent Owner argues that

> the problem with [Petitioner's] argument is that Rabinovich explicitly makes clear that accesses made by the host are included in the access count. It says that for each entity E which can be hosts, cnt(E, xs) refer to the access count of E. So the access count of the host itself is also included in the access count.

Tr. 45:24–46:4.

As Petitioner points out, however, the parameter E in Rabinovich does not represent the number of accesses made by the host. Tr. 81:8–17. Instead, Rabinovich states that "[f]or each entity *E* (which can be hosts, areas, or autonomous systems) that appeared on preference paths of some requests to x_s in the last sampling interval, host *s* keeps the count of the number of these appearances, $cnt(E, x_s)$, referred to as the *access count* of *E*." Ex. 1006, 11. Rabinovich further explains that "an entity that frequently appears in preference paths may be a good candidate for placing an object replica." *Id.*

Dr. Ratner testifies that *cnt*(E, x_s) measures "the number of times in a sampling window the replica of *x* hosted at server *s* has been requested by client computers that are connected to *s* by a preference path that includes *E*." Ex. 1005 ¶ 253. Dr. Ratner explains that Rabinovich uses *cnt*(E, x_s) "as a measure of possible future demand for a replica of *x* on network entity *E*," and that the algorithm will not replicate to an entity *E* unless the potential demand at *E* for x exceeds a certain threshold. *Id*. (also referring to *cnt*(E, x_s) as an indicator of "the anticipated load on *E* if the replication is performed"). Dr. Jacobs does not contest or even address Dr. Ratner's testimony on this subject, other than simply discussing that Rabinovich refers to *cnt*(E, x_s) as "the *access count* of E" and considers that parameter in determining whether and where to replicate data. Ex. 2006 ¶ 45.

We credit Dr. Ratner's unchallenged testimony that *cnt*(E, x_s) refers to a measure of possible future demand for a replica of *x* on a network entity E, i.e., the anticipated load on E due to *x*. Ex. 1005 ¶ 253. This explanation is consistent with Rabinovich's statement that *cnt*(E, x_s) refers to the number of times E appeared on preference paths of some requests to x_s. Ex. 1006, 11. Therefore, although Rabinovich refers to *cnt*(E, x_s) as "the *access count* of E," the evidence of record demonstrates that *cnt*(E, x_s) in Rabinovich does not represent the number of accesses made by the host. Instead, it is related to the algorithm's search for a good location to place the replicated object. Ex. 1006, 11. In view of this, we disagree with Patent Owner's argument that Rabinovich's algorithm tracks the access count of the hosts themselves, and that the decision to replicate data depends upon this access. Tr. 46:7–9.

To the contrary, Rabinovich discloses that its hosts periodically and autonomously run the replication algorithms. Ex. 1006, 2, 11–14, Figs. 4, 5.

In contrast to the analysis presented above in section 3.E, here the decision regarding whether or not to replicate data does not depend upon there having been at least one access by a host. Instead, the algorithm uses the "*access count* of E" to determine the best candidates for replication. Although the algorithm still requires an access by a *client*, the client, in this ground, is not the "at least one computer unit" recited in the claim. Instead, the "at least one computer unit" is the first host that receives the replicated object from the client. Because Rabinovich's algorithm does not "depend" on an access by the first host that receives the replicated object from the client, we are persuaded that Petitioner has demonstrated adequately that the Rabinovich's algorithm "send[s], from the at least one data storage device to the another data storage device, a copy of the received piece of data for redundant storage . . . independently of an access of the at least one computer unit."

Patent Owner also argues that the "'independent of an access' language reflects the fact that the patented invention copies and stores data in a decentralized way." PO Resp. 27. Patent Owner contends that Rabinovich uses a centralized replicator hierarchy for copying functions, including a root replicator that directs multiple area replicators. *Id.* at 31 (citing Ex. 1006, 11, Fig. 3). According to Patent Owner, Rabinovich's use of a centralized replicator further demonstrates why it does not disclose copying data "independent of an access of the computer unit." *Id.* at 31–33. Additionally, Patent Owner argues that it is the centralized replicator, not the data storage devices themselves, that performs the copying. *Id.* at 31–32.

Petitioner counters that Rabinovich's replicator hierarchy "plays no role when a storage host seeks to replicate data to another host in the same area." Reply 16. According to Petitioner, Patent Owner's arguments apply

only if copy operations extend across storage areas. *Id.* at 18. When copying within the same area, however, Rabinovich teaches that the host itself is responsible for determining to replicate the data, for selecting the area where the data is to be copied, and for carrying out the transfer. *Id.* at 16 (citing Ex. 1006, 10, 14–15). Petitioner, therefore, argues that Rabinovich discloses copying data from one storage device to another "independently of an access of the computer unit." *Id.* at 18.

We are persuaded by Petitioner's arguments. As Petitioner points out, Rabinovich discloses that "[t]here is one replicator in each internal area," and "[i]t is also convenient to consider hosts as trivial replicators, with a single subordinate host." Ex. 1006, 10. Rabinovich further teaches that the hosts themselves run the replication algorithms. *Id.* at 11–14. These teachings demonstrate that Rabinovich discloses copying data between storage devices (i.e., hosts) in a "decentralized way."

For all of the foregoing reasons, we find Petitioner has established, by a preponderance of evidence, that Rabinovich discloses copying data from one storage device to another "independently of an access of the computer unit."

2. The Undisputed Limitations

Based on the complete record developed during trial, we find that Petitioner has presented sufficient evidence showing that Rabinovich discloses each of the remaining, undisputed limitations of claims 1–14.

For example, claim 1 recites:

> A non-transitory computer program product for causing a data storage device to copy data over a network by receiving data from or sending data to at least one of a plurality of data storage devices in which data is stored redundantly as a function of

> measured data transmission performance between at least one computer unit that stores at least one complete file of data, each file including a plurality of individual pieces of data, the pieces containing parts of the file, and the plurality of data storage devices, the computer program product comprising a non-transitory computer-readable medium storing computer-readable program code.

Petitioner argues that Rabinovich describes a computer system having software that causes devices within the system to run its deciding and distributing algorithms, and therefore discloses a "non-transitory computer program product." Pet. 39. Petitioner also argues that Rabinovich's hosts/servers connected by a network correspond to the required plurality of data storage devices. *Id.* As discussed above, a host in Rabinovich can be the required "computer unit." *Id.* at 39–40. Petitioner thus argues that a host/computer unit in Rabinovich stores a "complete file" when it stores an "object," and replicates objects to different hosts/servers, which then store that object. *Id.* Petitioner thus argues that the receiving hosts/servers correspond to the claimed "data storage units." *Id.* According to Petitioner, when the sending host (i.e., computer unit) replicates an object more than once, the data is redundantly stored in the receiving hosts/servers (i.e., data storage units). *Id.* at 39–41. Additionally, when one of the receiving hosts/servers replicates data to another host/server, "that would constitute the data storage unit to a data storage unit copying recited in the claims." *Id.* at 39. Petitioner takes the position that the "objects" disclosed in Rabinovich correspond to the recited "file[s] of data," and are stored, replicated, and served to clients. *Id.* at 28–29, 39–40. According to Petitioner, "the sheer existence of replicas means that the objects are redundantly stored in the hosts/servers," as required by claim 1. *Id.* at 40.

As to the language in claim 1 regarding storage of "at least one complete file of data, each file including a plurality of individual pieces of data," Petitioner argues that a person of ordinary skill in the art would understand the "object" in Rabinovich to include files, such as HTML pages, which are:

> inherently composed of pieces in the form of bits that make up bytes, the bytes themselves being pieces of the file. (Ex. 1005 at ¶ 325.) . . . When the object is a file and that object is replicated or migrated to a new host, then the complete file is stored by the receiving device.

Id.

Claim 1 further requires that the computer-readable program comprises:

> a set of instructions for receiving, in the at least one data storage device, at least one piece of data stored by a computer unit in a redundant manner in at least two data storage devices as a function of a measured data transmission performance between the at least one data storage device and the at least one computer unit.

Petitioner argues that when a Rabinovich host (the "computer unit") replicates an object to a new host (the "data storage unit"), the new host receives the required at least one piece of data. *Id.* at 40–41. Petitioner further contends that Rabinovich's algorithms constitute the required set of instructions. *Id.* at 41. According to Petitioner, "[w]hen the sending host replicates the object more than one time, the data is 'redundantly' stored." *Id.* With regard to the "measured data transmission performance" limitation, Petitioner contends that Rabinovich discloses using proximity measurements between hosts, as well as load measurements, to migrate or create replicas. *Id.*

Claim 1 next requires "a set of instructions for storing, in the at least one data storage device, the received piece of data." Petitioner contends that Rabinovich discloses this limitation because it teaches that replica hosts store data. *Id.* (citing Ex. 1006, Figs. 4, 5; Ex. 1005 ¶ 351).

Claim 1 additionally requires "a set of instructions for measuring, by the at least one data storage device, a data transmission performance between the at least one data storage device and another one of the plurality of data storage devices." Petitioner contends that Rabinovich provides instructions (e.g., the pseudocode of Figures 4 and 5 of Rabinovich) that each host/server uses to measure the data transmission performance between itself and other hosts/servers in the system to decide whether and where to redundantly store an object. *Id.* at 42 (citing Ex. 1006, 10–17, Ex. 1005 ¶ 352).

Lastly, claim 1 recites:

> a set of instructions for sending, from the at least one data storage device to the another data storage device, a copy of the received piece of data for redundant storage as a function of the measured data transmission performance between the data storage devices and independently of an access of the at least one computer unit.

Petitioner contends that Rabinovich discloses instructions for sending data from one host/server (i.e., a data storage device) to another based on measured data transmission performance, namely, the distance between the hosts/servers and the load of each candidate host described above. *Id.* (citing Ex. 1006, 12, 14, Figs. 4, 5).

Petitioner provides similar information and arguments with regard to the unpatentability of independent claim 8 and dependent claims 2–7 and 9–14 under 35 U.S.C. § 103. *See* Pet. 33–38, 43–48.

For Example, claims 4 and 6 depend from claim 1, and claims 11 and 13 depend from claim 8, and each dependent claim requires detecting "a plurality of predetermined parameters for data transmissions" either between a data storage device and a computer unit (claims 6 and 13) or between a first and second data storage device (claims 4 and 11). Petitioner argues that Rabinovich reads on these limitations because it discloses instructions for hosts to detect a plurality of data transmission parameters – distance and load. *Id.* at 44–45, 48.

Taking into account the information and arguments provided by Petitioner, including the Ratner Declaration, and in view of our claim constructions noted above, wherein "computer unit" encompasses any computing device, we determine that Petitioner has identified sufficiently where each claim element of claims 1–14 is allegedly disclosed in Rabinovich as discussed above. Accordingly, we are persuaded that Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–14 are anticipated by Rabinovich.

IV. CONCLUSION

For all of the foregoing reasons, taking into account the parties' contentions and supporting evidence developed during trial and our claim constructions recited above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–14 are unpatentable under 35 U.S.C. § 102 as anticipated by Rabinovich.

V. ORDER

For the reasons given, it is hereby

ORDERED that claims 1–14 are held unpatentable; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

PETITIONER:

Daniel T. Shvodian
Christopher L. Kelley
PERKINS COIE LLP
dshvodian@perkinscoie.com
ckelley@perkinscoie.com

PATENT OWNER:

Minghui Yang
DINOVO, PRICE, ELLWANGER & HARDY LLP
myang@dpelaw.com

Andrew G. DiNovo
DINOVO, PRICE, ELLWANGER & HARDY LLP
adinovo@dpelaw.com

Steven E. Tiller
WHITEFORD, TAYLOR & PRESTON LLP
stiller@wtplaw.com