

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VMWARE, INC., INTERNATIONAL BUSINESS MACHINES
CORPORATION and ORACLE AMERICA, INC.,
Petitioner,

v.

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH
INSTITUTE,
Patent Owner.

Case IPR2014-00901
Case IPR2014-00949¹
Patent 6,978,346 B2

Before BRIAN J. McNAMARA, MIRIAM L. QUINN, and
GREGG I. ANDERSON, *Administrative Patent Judges*.

ANDERSON, *Administrative Patent Judge*.

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

¹This case was joined with IPR2014-00901 on Jan. 28, 2015 by Order in IPR2014-00949, Paper 25.

I. INTRODUCTION

A. Background

On July 21, 2014, VMWare, Inc. (“Petitioner”)² filed a Second Corrected Petition requesting an *inter partes* review of claims 1–9 of U.S. Patent No. 6,978,346 B2 (Ex. 1001, “the ’346 patent”). Paper 8 (“Pet.”). Electronics and Telecommunications Research Institute (“Patent Owner”) filed a Preliminary Response. Paper 11. Based on these submissions, on December 11, 2014, we granted the Petition and instituted trial for claims 1–9 of the ’346 patent on one of the grounds of unpatentability alleged in the Petition. Paper 14 (“Institution Decision” or “Dec. Inst.”).

After institution of trial, Patent Owner filed a Patent Owner Response. Paper 19 (“PO Resp.”). Petitioner filed a Reply. Paper 28 (“Pet. Reply”). In addition, the parties rely upon expert testimony. Petitioner proffered the Declaration of Dr. Robert Horst (“Horst Declaration,” Ex. 1003). Patent Owner proffered two declarations of Dr. Thomas Conte. First is a declaration from *Dell Inc. v. Electronics and Telecommunications Research Institute*, IPR2013-00635 (“’635 IPR”), a trial directed to the same ’346 patent (“Conte ’635 Declaration,” Ex. 2003). Second is a declaration of Dr. Conte filed with Patent Owner’s Response (“Conte ’901 Declaration,” Ex. 2301). Patent Owner also filed a declaration of Dr. Randy Katz (“Katz Declaration,” Ex. 2202), from another *inter partes* review directed at the ’346 patent, *International Business Machines Corp. v. Electronics and Telecommunications Research Institute*, Case IPR2014-00976. A transcript of Dr. Conte’s deposition (“Conte Dep.,” Ex. 1017) was submitted by

² International Business Machines Corporation (“IBM”) and Oracle America, Inc. (“Oracle”) are petitioners in IPR2014-00949, which is joined to this case, and are included in any reference to “Petitioner.”

Petitioner. A transcript of Dr. Horst's deposition ("Horst Dep.," Ex. 2302) was submitted by Patent Owner.

An oral hearing was held on August 28, 2015. The transcript of the consolidated hearing has been entered into the record. Paper 34 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). We conclude for the reasons that follow that Petitioner has not shown by a preponderance of the evidence that claims 1–9 of the '346 patent are unpatentable.

B. Related Proceedings

Petitioner advises that the '346 patent is involved in the following co-pending district court cases: *Safe Storage LLC v. StoneFly, Inc.*, 1:13-cv-01152;³ *Safe Storage LLC v. Int'l Business Machines Corp.*, 1:13-cv-01151; *Safe Storage LLC v. Emulex Corporation et al*, 1:13-cv-01150; *Safe Storage LLC v. 3PAR Inc.*, 1:13-cv-01088; *Safe Storage LLC v. Oracle America Inc. et al*, 1:13-cv-01089; *Safe Storage LLC v. ATTO Technology Inc. et al.*, 1:13-cv-01090; *Safe Storage LLC v. VMware Inc.*, 1:13-cv-00928; *Safe Storage LLC v. Promise Technology Inc.*, 1:13-cv-00927; *Safe Storage LLC v. Nexsan Corporation*, 1:13-cv-00931 ; *Safe Storage LLC v. Overland Storage Inc.*, 1:13-cv-00932; *Safe Storage LLC v. IQSS LLC*, 1:13-cv-00930; *Safe Storage LLC v. Infortrend Corporation*, 1:13-cv-00929; *Safe Storage LLC v. Cisco Systems, Inc.*, 1:13-cv-00926; *Safe Storage LLC v. Silicon Graphics Int'l Corp.*, 1:12-cv-01629; *Safe Storage LLC v. Dot Hill Systems Corp.*, 1:12-cv-01625 ; *Safe Storage LLC v. Hitachi Data Systems Corp.*, 1:12-cv-01627; *Safe Storage LLC v. Dell Inc.*, 1:12-cv-01624; *Safe Storage LLC v. NetApp Inc.*, 1:12-cv-01628; *Safe Storage LLC v. Hewlett-*

³ Litigation concluded. Paper 3, 3.

Packard Company, 1:12-cv-01626, all pending in the United States District Court for the District of Delaware. Pet. 1, Paper 3, 2–3.

In a final written decision in the '635 IPR we determined that claims 1–3 and 5–8 of the '346 patent had not been shown to be unpatentable. '635 IPR, Paper 39. We declined to institute *inter partes* review of the '346 patent in the following cases: *Dell Inc., Hewlett-Packard Co., & NetApp, Inc. v. Electronics & Telecommunications Research Institute*, IPR2014-00152, Paper 12 (PTAB May 16, 2014); *Dell Inc., Hewlett-Packard Co., & NetApp, Inc. v. Electronics & Telecommunications Research Institute*, IPR2014-00549, Paper 10 (PTAB Mar. 26, 2015); and *International Business Machines Corp. v. Electronics & Telecommunications Research Institute*, Case IPR2014-00976, Paper 14 (PTAB Dec. 11, 2014)(“'976 IPR”).

C. The '346 Patent

The '346 Patent describes an apparatus with “redundant interconnection between multiple hosts and a redundant array of inexpensive disks (hereinafter referred to as ‘RAID’).” Ex. 1001, Abstract. As a result of the redundant interconnection, the apparatus allows increased bandwidth in the event one of the two RAID controllers 460 and 461 has a failure. *Id.* at 3:1–9.

Figure 4 of the '346 patent is reproduced below:

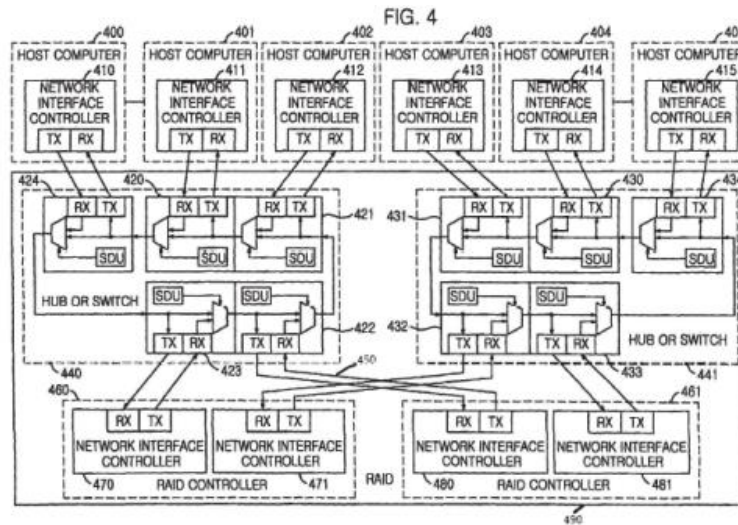


Figure 4 is a block diagram of a host matching system including RAID 490 and its interconnection to host computers 400–405. Ex. 1001, 2:64–3:6. RAID 490 includes two RAID controllers 460, 461 and hubs 440, 441. *Id.* at 3:10–18. Each RAID controller includes a pair of network interface controllers. For example, RAID controller 460 includes network interface controllers 470, 471, and RAID controller 461 includes network interface controllers 480, 481. *Id.* at 3:11–13. Each host computer has its own network interface controller (410 to 415), which connects the host computer through the hubs and to network interface controllers (470, 471, 480, 481) of RAID controllers 460, 461. *Id.* at 3:31–35.

The '346 patent describes that the result is two independent networks with twice the bandwidth of a single network and a “communication passage” between the two RAID controllers. *Id.* at 3:62–64. The communication passage creates a “fault tolerant function” should one of RAID controllers 460 or 461 fail. *Id.* at 3:64–66. According to Figure 4, communications line 450 interconnects network interface controller 480 of RAID controller 461 and network interface controller 470 of RAID

controller 460. *Id.* at 4:2–6; Fig. 4. Then, RAID controller 461 may send information to RAID controller 460. *Id.* In like manner, network interface controller 471 of RAID controller 460 may be connected over communications lines to network interface controller 481 of RAID controller 461, allowing RAID controller 460 to send information to RAID controller 461. *Id.* at 3:66–4:2.

By the arrangement described, the apparatus continues to operate in the event either RAID controller 460 or 461 has an “occurrence of an error.” Ex. 1001, 4:19–25. The interconnected network interface controller of the operational RAID controller assumes the functions of the network interface controller of the failed RAID controller. *Id.*

D. Illustrative Claims

Claims 1 and 9, the two independent claims of the challenged claims, are reproduced below:

1. An apparatus for a redundant interconnection between multiple hosts and a RAID, comprising:

a first RAID controlling units and a second RAID controlling unit for processing a requirement of numerous host computers, the first RAID controlling unit including a first network controlling unit and a second network controlling unit, and the second RAID controlling unit including a third network controlling unit and a fourth network controlling unit; and

a plurality of connection units for connecting the first RAID controlling units and the second RAID controlling unit to the numerous host computers, wherein the first RAID controlling unit and the second RAID controlling unit directly exchange information with the numerous host computers through the plurality of connecting units, and the first network controlling unit exchanges information with the fourth network controlling

unit, and the second network controlling unit exchanges information with the third network controlling unit.

Ex. 1001, 5:7–26.

9. An apparatus for a redundant interconnection between multiple host computers and a RAID, the apparatus comprising:

a plurality of connection units for connecting the host computers and the RAID;

a first and a second RAID controllers, included in the RAID, each of which having a first network interface controller and a second network interface controller for processing requests from the plurality of the host computers connected through the plurality of the connection units,

wherein the first network interface controller in the first RAID controller supplies data to the host computers connected through the plurality of connection units and processes information transmitted from the second network interface controller in the second RAID controller,

wherein the first network interface controller in the second RAID controller supplies data to the host computers connected through the plurality of connection units and processes information transmitted from the second network interface controller in the first RAID controller,

wherein the second network interface controller in the first RAID controller is used for fault tolerance by performing functions of the first network interface controller in the second RAID controller when the second RAID controller is faulty, and

wherein the second network interface controller in the second RAID controller is used for fault tolerance by performing functions of the first network interface controller in the first RAID controller when the first RAID controller is faulty, and

wherein the first network controlling unit in the first RAID controlling unit exchanges information with the second network controlling unit in the second RAID controlling unit, and the second network controlling unit in the first RAID controlling unit exchanges information with the first network controlling unit in the second RAID controlling unit.

Ex. 1001, 6:20–59.

E. Grounds Upon Which Trial was Instituted

Inter partes review was instituted on the following grounds: 1–9 as obvious over Mylex⁴ and Hathorn.⁵ Dec. Inst. 22.

F. Claim construction

In an *inter partes* review, “[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b); see *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–76 (Fed. Cir. 2015); see also Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012) (Claim Construction). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a special definition or other consideration, “limitations are not to be read into

⁴ Kevin J. Smith, Mylex Corp., STORAGE AREA NETWORKS; UNCLOGGING LANS AND IMPROVING DATA ACCESSIBILITY, published May 29, 1998 (“Mylex,” Ex. 1006).

⁵ US 5,574,950 to R. G. Hathorn et al., issued Nov. 12, 1996 (“Hathorn,” Ex. 1006).

the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. Terms Disputed After the Decision on Institution

Patent Owner identifies three terms for construction in its Response. PO Resp. 12–22. Petitioner contests two of the terms, “RAID” and “hub and switch.” Pet. Reply 2–7.

a. “RAID” (Claims 1 and 9)

In the Final Written Decision in the ’635 IPR (“’635 Final Decision” or “’635 Final Dec.”), we construed “RAID,” as the term is used in the ’346 patent, to mean “a single logical unit for mass storage using multiple physical disk drives.” ’635 Final Dec. 9. In the Petition, prior to the ’635 Final Decision, Petitioner asserted that “RAID” should be construed as “redundant array of inexpensive disks.” Pet. 6 (citing Ex. 1001, Abstract, Ex. 1003 ¶¶ 14–16).

Both Patent Owner’s Response and Petitioner’s Reply were filed after the ’635 Final Decision. For purposes of this case, Patent Owner accepts the construction from the ’635 Final Decision, providing facts and arguments supporting that construction. PO Resp. 12–16. Petitioner’s Reply continues to urge adoption of its proposed construction from the originally filed Petition. Pet. Reply 2–6.

The written description of the ’346 patent restates the acronym for RAID, but otherwise lacks additional description of RAID or its functionality. Consistently throughout the written description, RAID is referred to in the singular, i.e., “the apparatus for a redundant interconnection between multiple hosts and *a RAID* comprises a plurality of RAID controllers.” Ex. 1001, 2:16–18 (emphasis added). The claims also

recite “a RAID.” *Id.* at 5:7–8. Figure 4 of the ’346 patent shows RAID 490 as a single component within a box which includes two RAID controllers 460 and 461. Similarly, the ’346 patent represents the prior art RAID as a single component. Ex. 1001, Fig. 1, element 130; Fig. 2, element 240; Fig. 3, element 340. Neither party relies on the prosecution history (Exhibits 1002, 2001), and our independent review of that history failed to reveal any additional insight as to the term’s meaning.

Patent Owner’s expert, Dr. Conte, testified that a RAID is a mass storage device built from multiple, physical disk drives. Ex. 2003 ¶ 18, Ex. 2301 ¶ 30. Patent Owner and Dr. Conte both point to dictionary evidence to respectively argue and opine that a RAID is a “single logical drive.” PO Resp. 14, Ex. 2301 ¶ 30 (citing Exs. 2004,⁶ 2005⁷). That a RAID is built from multiple, physical disk drives is uncontroverted. That a RAID is a single logical unit is supported by Petitioner’s expert, Dr. Horst, who testified that “[a] RAID array needs to be able to present a set of drives as a single logical unit, but it does not always have to present a single logical unit.” Ex. 2302, 16:14–21.

Although the two dictionary definitions cited by Patent Owner and Dr. Conte are found in dictionaries published after the foreign priority date of the ’346 patent, they further substantiate the proposition that those of ordinary skill generally refer to RAID as a single logical unit. *Webster’s*, for example, generally defines RAID as proposed by Petitioner. Ex. 2004, 308. However, *Webster’s* proceeds to define various levels of RAID, e.g., RAID 0, 1, 2, 5, and 10, all including as part of the definition a “single logical

⁶ *Webster’s Computer Dictionary* (9th ed. 2001)(“Webster’s”).

⁷ *Microsoft Computer Dictionary* (5th ed. 2002).

drive.” *Id.* Similarly, the *Microsoft Computer Dictionary*’s definition of RAID, which does not define levels of RAID, states that the “data is distributed across a group of computer disk drives that function as a single storage unit.” Ex. 2005, 437.

The prior art also supports a construction of RAID as being a “single logical drive.” Weygant discloses that a RAID is a single logical unit, but also in “various combinations of striped and mirrored configurations.” Ex. 2101, 153.⁸ Chen’s discussion of RAID technology states that the problem of obtaining high performance is addressed by “arrays, which organize multiple independent disks into *a large, high-performance logical disk.*” Ex. 2102, 2 (emphasis added).

In further support of its position that our construction from the ’635 Final Decision is correct, Patent Owner presents evidence not of record in the ’635 IPR, including DeKoning (U.S. Patent No. 6,073,218, Ex. 1010). Patent Owner quotes from DeKoning as explaining that a RAID controller “makes the subsystem [RAID] appear to the host computer as a **single, highly reliable, high capacity disk drive.**” PO Resp. 15–16 (citing Ex. 1010, 1:65–2:14).

Patent Owner quotes from the petition in the ’976 IPR (Ex. 2201), where Petitioners IBM and Oracle argued that “the Chong reference (U.S. Patent No. 6,070,251; Ex. 2303) discloses a RAID ‘because the two data storage devices appear to the hosts as a single, reliable drive.’” PO Resp. 16 (citing Ex. 2201, 13). Patent Owner also points to testimony from the Katz Declaration in the ’976 IPR that Chong’s alleged “combination of data

⁸ Page reference is to the actual page number of Weygant and Chen and not Patent Owner’s exhibit number.

mirroring and fault tolerance makes the two data storage devices appear as a single, reliable drive to the hosts, or in other words, a RAID.” *Id.* at 16 (citing Ex. 2202 ¶ 36)(emphasis added).

Petitioner argues for its proposed construction, Redundant Array of Inexpensive Disks, is based on the use of quotation marks around “RAID” as used in the ’346 patent. Pet. Reply 2–3 (citing Ex. 1001, 1:9–10). We are not persuaded that the use of the acronym in the Specification dictates that the broadest reasonable interpretation of RAID is the words of the acronym. For example, the Specification describes RAID as a single item, i.e., as a “single logical entity.”

Petitioner argues that the construction of RAID from the ’635 Final Decision is incorrect for a number of reasons. Petitioner points out that the *Webster’s* definition does not support the “single logical drive” construction of RAID. Pet. Reply 3 (citing Ex. 2004, 308). As discussed above, *Webster’s* describes RAID generally as including levels, then defines the levels separately, each as including a “single logical drive.” However, that the general RAID definition and the definition of RAID 10 from *Webster’s*, or any other dictionary, do not include the “single logical drive,” is not dispositive. Rather, we must look to how the person of ordinary skill in the art would understand a RAID. *See Translogic Tech.*, 504 F.3d at 1257. The evidence of what would be understood by one of ordinary skill, as represented by the testimony of Drs. Horst, Conte, and Katz, and authors Weygant, Chen, and Chong, is compelling. Petitioner’s argument based on the *Webster’s* definition of RAID is, at best, equivocal from an evidentiary standpoint. Indeed, Petitioner acknowledges that RAID can present as a “single logical unit [drive].” Pet. Reply 3. We, therefore, are not persuaded

that Petitioner has met its burden of proving that the proffered dictionaries support a broader construction of RAID, i.e., to not be defined as a “single logical drive.”

Petitioner also submits various arguments concerning Hathorn’s teachings of the storage devices to inform our analysis of the scope of the term “RAID.” Pet. Reply 3–6. These arguments do not persuade us to adopt Petitioner’s proposed construction. First, Petitioner’s arguments beg for a comparison of the definition of RAID to the storage devices disclosed in Hathorn. We are not persuaded by Petitioner’s arguments for three reasons.

First, we are tasked in this Decision with determining whether Hathorn, the asserted prior art, discloses a “RAID.” Therefore, relying on Hathorn to guide the definition of the term is putting the cart before the horse. Second, Hathorn’s teaching of a RAID is inconclusive. Hathorn statement of a RAID is limited to a discussion in the Background of the Invention where a “redundant array of inexpensive devices (RAID)” is discussed as a data back-up alternative. Ex. 1005, 2:4–7. Hathorn provides no further instruction as to whether the disclosed disks operate in a RAID configuration.

Third, Hathorn confirms our analysis of the scope of the term RAID including a single logical unit. Hathorn appears to dismiss the use of a RAID configuration and single volume of mirrored data for use in disaster recovery of an entire system or site. *Id.* at 2:19–24. For example, Hathorn states that the reason the aforementioned back-up solutions (including a RAID configuration) are useful only for device failures is that “the secondary data has the same volume serial numbers (VOLSERs) and DASD

addresses as the primary data.” *Id.* at 2:16–18. That is, a RAID-based back-up had the feature of appearing as a single unit. Hence, Hathorn focuses its disclosure of the invention as multiple DASDs with emphasis on remote dual copies. *See, e.g.*, Ex. 1005, 5:25–36, 6:21–39 (describing “remote dual copy systems” and referring to Figure 2 depicting multiple primary DASDs).

⁹ We also note that despite RAID being known at the time, Hathorn does not mention a RAID in describing the Hathorn remote dual copy system.

Petitioner concludes with an argument that our construction of RAID from the ’635 Final Decision “excludes a fundamental aspect of a RAID—**redundant** storage—yet includes terms such as ‘single logical unit,’ ‘mass storage,’ and ‘physical disk drives’ that are found nowhere in the ’346 patent.” Pet. Reply 6. Petitioner’s argument does not cite any supporting authority and, accordingly, is unpersuasive. Further, while the Specification is important in our construction, we still need to consider how RAID would be understood by the person of ordinary skill. *See Translogic*, 504 F.3d at 1257.

Accordingly, having considered the claim construction arguments made by Petitioner in its Reply regarding Hathorn, and weighing that against the evidence presented by Patent Owner, including the testimony of Dr. Conte, which we credit, we conclude that a RAID would have been understood by a person of ordinary skill in the art to have a customary meaning of “a single logical unit for mass storage using multiple physical disk drives.”

⁹ Petitioner’s arguments regarding Hathorn’s allege disclosure of a RAID are considered in more detail in the analysis section of this Decision.

b. “connection unit/hub/switch” (Claim 5)

In the '635 Final Decision, we found that, consistent with the definition provided in the Specification, “connection unit” is “a hub or switch.” '635 Final Dec. 14 (citing Ex. 1001, 3:13–18). We noted that Figure 4 of the '346 patent shows components 440 and 441 labeled as a “HUB OR SWITCH.” *Id.* Petitioner proposed this construction in the Petition and in the Reply. Pet. 7, Pet. Reply 6–7. Thus, we determined that the Specification treats “hub” and “switch” as equivalents. '635 Final Dec. 14.

Relying on the Conte Declaration, Patent Owner argues the person of skill in the art would view “hub” as different from “switch.” PO Resp. 20 (citing Ex. 2301 ¶¶ 58–59). Patent Owner acknowledges that the '346 patent equates hub and switch, but argues that they are not the same “for all purposes.” *Id.* at 21. If “hub” were intended to mean “hub or switch,” Patent Owner argues that instead of “HUB OR SWITCH” as the label for connection units 440 and 441 in Figure 4, the drawings would have just used the word “hub.” *Id.*

Patent Owner argues our construction based on the Specification “does not so clearly redefine the term ‘hub’ so as to conflate terms that have different meanings.” PO Resp. 21–22 (citing *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998)). Patent Owner also argues against our construction based on claim differentiation, arguing claim 5 refers to “hub equipment” whereas claims 6 and 7 refer to “network switch equipment.” Claims 5 and 6 are otherwise identical, claim 7 differing with respect to another limitation not at issue.

We are not persuaded by Patent Owner's arguments. It is always necessary to review the Specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. See *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).¹⁰ The claims must be read in view of the Specification. *Id.* Patent Owner's evidence of how a person of ordinary skill would understand the terms is that the terms, though different, are both "network interconnection devices." Ex. 2301 ¶¶ 58–59. Additionally, Patent Owner's expert acknowledged "hub" and "switch" may be used interchangeably. See Pet. Reply 7 (citing Ex. 2302, 30:16–18). The Specification recognizes this as well, stating that "hubs 440, 441 are provided to connect a system connected to these hubs by one network and maintain the network ..., and it can be as a hub or a switch. *Hereinafter, they are named a 'hub' altogether.*" *Id.* at 6–7 (citing Ex. 1001, 3:13–18).

Thus, consistent with the Specification and our construction from the '635 Final Decision, "connection unit" is "a hub or switch."

c. "*exchange/exchanges information*" (Claims 1 and 9)

In the '635 Final Decision, we interpreted "exchange" and "exchanges information" according to their ordinary sense: to transmit and receive information reciprocally.¹¹ '635 Final Dec. 12. The Petitioner proposed this construction in the Petition. Pet. 7 (citing Ex. 1003 ¶¶ 14–16).

¹⁰ While district courts do not apply our broadest reasonable interpretation standard in infringement cases, the Federal Circuit is our reviewing court and this principle is universal.

¹¹ *Definition exchange (vb) (3)*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY, UNABRIDGED (1993), *available at* <http://lionreference.chadwyck.com> (Dictionaries/Webster's Dictionary) (Exhibit 3001).

Patent Owner neither agrees or disagrees with the construction from the '635 Final Decision. PO Resp. 17–19. Instead, based on the language differences in claims 1, 4, and 9, Patent Owner contends there are differences in how “network interface controllers” exchange information. *Id.* at 17. Patent Owner does not raise any issue as to how our construction of “exchanges information” should change as a result.

Consistent with our construction from the '635 Final Decision, we construe “exchange/exchanges information” to mean “to transmit and receive information reciprocally.”

2. Terms not Disputed After the Decision on Institution

The following two terms were construed in the Institution Decision but not addressed in Patent Owner’s Response nor Petitioner’s Reply.

a. “RAID controller/RAID controlling unit” (Claims 1 and 9)

In the '635 Final Decision, we construed “RAID controlling unit,” as the term is used in the '346 patent, to mean “a component that controls operation of the RAID.” '635 Final Dec. 10–11. Petitioner proposed this construction in the Petition. Pet. 7 (citing Ex. 1003 ¶¶ 14–16).

Neither the Response nor the Petitioner’s Reply propose any alternative construction. Accordingly, applying the broadest reasonable interpretation to the term RAID controlling unit, we construe “RAID controlling unit” to mean “a component that controls operation of the RAID.”

b. “network interface controller”/“network controlling unit”/“network interface controlling unit” (Claims 1 and 9)

In the '635 Final Decision we interpreted “network controlling unit.” as “a component, connected to a network, for providing communication over the network.” '635 Final Dec. 12–14. Petitioner treats the terms “network

interface controller,” “network controlling unit,” and “network interface controlling unit” as equivalents and urges they should be construed identically. Pet. 7, *see also* Prelim. Resp. 20 (“synonymous phrases ‘network controlling unit’ and ‘network interface controller’”).

The Specification describes each “network interface controller” as having a counterpart “network interface controller,” each “network interface controller” associated with a separate RAID controller. Ex. 1001, 2:26–30. Furthermore,

information from a second network interface controller **622** of a first RAID controller **620** is sent to a first network interface controller **632** of a second RAID controller **630**, and information from a second network interface controller **632** of the second RAID controller **630** is transmitted to a first network interface controller **621** of the first RAID controller **620**.

Id. at 4:40–46. Thus, we construe “network controlling unit” and its equivalents to mean “a component, connected to a network, for providing communication over the network.”

II. ANALYSIS

Petitioner contends that claims 1–9 of the ’346 patent are obvious under 35 U.S.C. § 103 over Mylex and Hathorn. Pet. 17–42. To support this position, Petitioner relies on the testimony of Dr. Horst. Ex. 1003 ¶¶ 56–138.

A. Overview of Prior Art

1. Mylex

Mylex generally describes Storage Area Networks (“SAN”) and associated architecture of such networks. Ex. 1006, 4.¹² Storage Area Networks can be configured with switched fabrics or hubs and switches to exchange data between nodes of the network. *Id.* at 8.

Figure 6 of Mylex is reproduced below.

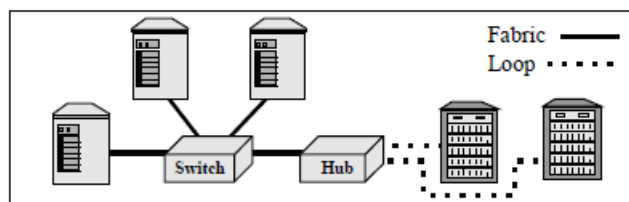


Figure 6. SAN With Switched and Shared (Loop) Interconnects

Figure 6 shows that switches are used to create fibre channel fabric. *Id.* Mylex describes that hub-connected Storage Area Networks bandwidth per node decreases as more nodes are added while bandwidth of fabric connected nodes increases as nodes are added. *Id.*

Figure 7 of Mylex is reproduced below.

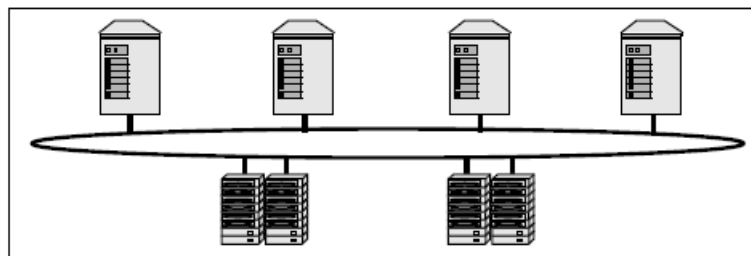


Figure 7. Four Node Cluster With Shared Access to RAID Arrays

¹² Page references are to Mylex page numbers at the bottom right corner of each page. Petitioner uses the same numbers and not the exhibit page numbers centered at the bottom of the page.

Figure 7 shows a four node cluster with shared access to RAID arrays. *Id.* at 9. Mylex describes that external RAID controllers can be used in a write-back caching scheme to protect data. *Id.* at 12.

Mylex controllers are linked by a private network used to transmit “I’m alive” heartbeat messages. Ex. 1006, 17. The absence of heartbeat messages signals that one of the controllers is off-line and the remaining controller immediately initiates a failover operation and then begins servicing I/O requests directed to itself and its off-line partner to provide non-stop access to data. *Id.* Figure 17 of Mylex is reproduced below.

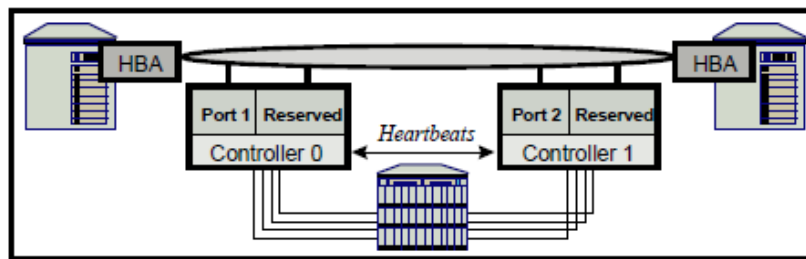


Figure 17. Normal Operating Mode of Dual DAC SF and FL Fibre Controllers

As shown in Figure 17, for fibre controllers, Mylex describes that if a controller fails, i.e., a failover, the surviving controller senses the absence of heartbeats and fails over the ID of the active port (Port 1 and Port 2) on the failed controller to its reserved port (Reserved), and updates its data structures with configuration information stored on the disk. *Id.* at 19.

2. Hathorn

Hathorn discloses a “remote dual copy system” with dynamically modifiable ports on the storage controller that are alternatively configurable. Ex. 1005, Abstract, 7:57–8:16, Fig.3. A primary storage controller can appear as a host processor to a secondary storage controller. *Id.* Hathorn describes a method for communicating between host processors and storage

controllers, or between storage controllers. Hathorn incorporates direct access storage device (“DASD”) for storage of data. *Id.* at 1:28–33.

Figure 3 of Hathorn is reproduced below.

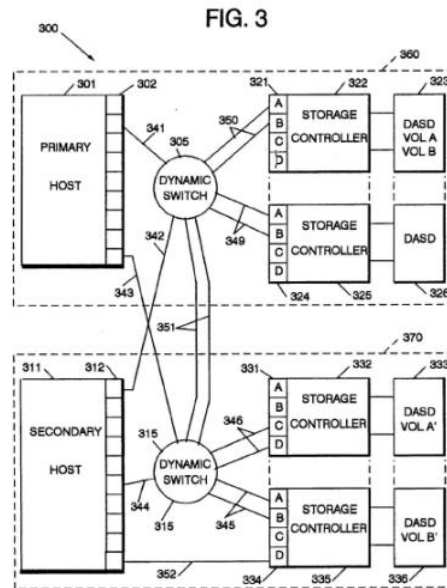


Figure 3 is a block diagram of the preferred embodiment of the remote dual copy system of the invention described in Hathorn. Ex. 1005, 5:27–30. The storage components 323, 326, 333, and 336 are labelled as DASDs.

Primary storage controller 322 communicates through port A 321 with secondary storage controller 332. *Id.* at 8:11–15. As shown in Figure 3, port A 321 acts as a channel link-level facility through communication links 350, dynamic switch 305, communication links 351, dynamic switch 315, and communication links 346 to communicate with secondary storage controllers 332 and/or 335. *Id.*

B. Obviousness Analysis

1. Introduction

Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966) establishes an objective analysis for determining obviousness under 35 U.S.C. § 103(a) as follows:

[T]he scope and content of the prior art are ... determined; differences between the prior art and the claims at issue are ... ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

See 35 U.S.C. § 103(a).

Under the *Graham* analysis, Petitioner has identified the difference between Mylex and the claims at issue: that Mylex does not show “a direct exchange of information between network interface controlling units.” Pet. 18. Petitioner asserts that the difference is found in Hathorn. *Id.* Patent Owner argues that the person of ordinary skill in the art would not have combined Hathorn with Mylex, making several arguments in support. PO Resp. 26–56.

Dr. Horst testifies that, as of the year 2000, the person of ordinary skill would have had a B.S. in Electrical Engineering or Computer Science and at least two years of experience in designing storage systems. Ex. 1003 ¶ 12. Dr. Conte does not provide any specific opinion in this regard. See, e.g., Ex. 2301 ¶ 25. We determine Dr. Horst’s opinion is both not disputed and reasonable. Accordingly, we adopt Dr. Horst’s description of the level of ordinary skill for this case.

KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398 (2007) provides a framework for analyzing obviousness of claimed subject matter. *KSR* addresses specifically combining elements found in the prior art to establish that the differences between the claim and the prior art combination would have been obvious to the person of ordinary skill at the time the invention was made. *KSR* summarizes factors considered previously, including whether the combination yields no more than predictable results. *KSR*, 550 U.S. at 416.

Often, it will be necessary to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

Id. at 418. “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Id.* At its core, the conclusion of obviousness under § 103 “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.*

2. Summary of Parties’ Arguments

Petitioner argues that claims 1–9 of the ’346 patent are obvious over Mylex and Hathorn. Pet. 17. Petitioner argues specifically that Mylex teaches all the limitations of claims 1–9 with the exception of a “direct exchange of information between network interface controlling units.” *Id.* at 18. Petitioner acknowledges that Mylex discloses only “heartbeat”

communication, but alleges that Hathorn teaches use of “the existing switch network for communication between RAID controllers.” *Id.*

Petitioner argues that one of ordinary skill would have been motivated to combine Hathorn with Mylex. Pet. 14–15 (citing Ex. 1003 ¶¶ 33–34). First, Petitioner alleges that there is a “close relationship” between the references. Pet. 14–15. Petitioner next argues that both Mylex and Hathorn are directed to the same field of endeavor. *Id.* at 15 (citing Ex. 1003 ¶¶ 33–34). Petitioner further argues, regarding motivation, that both Mylex and Hathorn disclose redundancy in “terms of sending communications between two or more RAID controllers and/or network interface controller ports.” *Id.* Petitioner argues that Hathorn teaches that communication paths are expensive and discloses using a switch network for communication, and is less costly than the direct heartbeat path of Mylex. *Id.* at 18 (citing Ex. 1003 ¶¶ 32, 48–55). Petitioner also argues more generally that, because of their similarity, the modification of Mylex’s heartbeat communications with the information exchange taught by Hathorn would lead to predictable results. *Id.* at 15 (citing Ex. 1003 ¶¶ 33–34).

Patent Owner’s main argument is that Hathorn is not a RAID and its teachings are not readily combinable with the RAID of Mylex. PO Resp. 26–27. Patent Owner lists additional reasons why the proposed modification of Mylex with Hathorn would not have been obvious. *Id.* at 27. The additional reasons are as follows: (1) it would not have been possible to modify Mylex to transmit those messages via the fibre loop as claimed because the “Reserved” ports are inactive/offline until a failure occurs on the primary ports (PO Resp. 28–30); (2) the only feasible way to transport the heartbeats over the host-side network in Mylex would not satisfy the claim

language (PO Resp. 30–33); (3) modifying Mylex to send the heartbeats via the host-side network is not supported by a sufficient motivation (PO Resp. 33–37); (4) the proposed modification is not a combination of known elements according to known methods to yield predictable results (PO Resp. 37–46); and (5) if one skilled in the art did not want to send heartbeats over the dedicated path provided for that purpose, then there is another alternative that would have been more apparent to one skilled in the art than the modification proposed by the Petitioner (PO Resp. 46–49).

As set forth in Petitioner’s Reply, Petitioner responds to Patent Owner’s main argument by stating Mylex and Hathorn are “readily combinable.” Pet. Reply 7. Specifically, Petitioner contends Mylex and Hathorn both disclose a RAID. *Id.* at 8. Even if Hathorn does not disclose a RAID, Petitioner asserts Hathorn is “properly combinable” with Mylex. *Id.* at 8–13.

3. Petitioner’s Arguments

Petitioner has the burden of proof, and, thus, we address each of the arguments made by Petitioner in support of combining Hathorn with Mylex.

a. Whether Hathorn is Analogous Art to Mylex and a RAID

While Patent Owner concedes that Hathorn and Mylex are in the same field of endeavor, it challenges Petitioner’s contention that Hathorn is a RAID. Tr. 44:9–45:3.

As discussed above in the claim construction section, Hathorn discloses a remote dual copy system based on the use of DASDs. Ex. 1005, 6:22–25, Fig. 2. Petitioner argues that Hathorn is a RAID based on our construction here and in the ’635 Final Decision because Hathorn’s “two controllers are logically paired for data shadowing and treated as a single

logical unit by the hosts.” Pet. Reply 8 (citing Ex. 1005, 9:45–49; Ex. 2302, 20:21–21:1, 107:9–25). We find that Petitioner has failed to meet its burden to show that Hathorn’s DASDs teach or suggest the use of a RAID, as we have defined the term.

First, we are not persuaded by Petitioner’s argument that Hathorn is a RAID that operates in two modes, one where storage is presented as a single logical unit to the host. Pet. Reply 3–4. The argument is premised on Hathorn’s disclosure that explains that the secondary device or volume, i.e., storage device, is “fenced from” normal data access but still receive control commands. *Id.* at 4 (citing Ex. 1005, 9:45–49). Petitioner then notes that RAIDs, according to Dr. Horst’s deposition testimony, are “fenced off” so that the host cannot access individual drives of the array. *Id.* (citing Ex. 2302, 20:21–21:1, 107:9–25). The cited Hathorn disclosure occurs in the discussion of “data shadowing,” where primary and secondary DASDs are paired into duplex pairs. Ex. 1005, 9:29–51. Hathorn describes “data shadowing” as the storage of data in a “secondary or remote location.” *Id.* at 2:40–44. The use of “fenced from” in Hathorn, however, only means that for each pair of DASDs, the “secondary device or volume is fenced from normal data access.” *Id.* at 9:45–49. Although there is some similarity between the function of Hathorn’s DASDs and a RAID, with regard to a “fenced from” volume of data, the fact remains that the multiple duplex pairs of Hathorn have not been shown to teach a single logical unit or device.

We also find unpersuasive the argument that Hathorn discloses a RAID because a RAID can have different configurations, such as individually addressable disks or multiple logical units. Pet. Reply, 4–5 (citing Ex. 2302, 161:25–162:17, 16:14–21). The testimony in this regard

does not support Petitioner's argument. We find that at best, Dr. Horst's testimony alludes to the ability of a system to include both a RAID volume and individual disks. *See* Ex. 2302, 161:7–9 (“the system at 3Ware could be configured either with RAID volumes or what's called JABOD. Just a bunch of disks is what that stands for.”) (emphasis added). Further, the proffered testimony is inconsistent with the context of the claim language. *See id.* at 162:16–17 (“As long as it supports some level of RAID, it's still a RAID.”). The claims do not refer to “supporting a RAID.” The claims affirmatively require “a RAID.” That is, the claims are not concerned with whether the disks could be configured as a RAID. Therefore, we find unpersuasive the testimony bearing on whether the capability of a RAID configuration is present in Hathorn.

Petitioner argues that because a RAID can perform “mirroring,” like Hathorn, then Hathorn is a RAID. Petitioner cites as support Patent Owner's expert, Dr. Conte, who testified that the '346 patent encompasses RAID mirroring. *Id.* at 5 (citing Ex. 1017, 52:15–17). Petitioner acknowledges the '346 patent uses RAID in the singular, but contends that does not preclude reference to mirroring, i.e., RAID level 1. *Pet. Reply* 5 (citing Ex. 1010, 1:57–60, Ex. 2302, 16:24–17:15). Again, we find that Hathorn's reference to mirroring does not make Hathorn's DASDs a RAID. We agree with Patent Owner that Hathorn is directed to non-RAID mirroring. *See Tr.* 45:19–46:13. That a RAID may also perform the mirroring function does not tend to prove the DASDs of Hathorn are a RAID, as claimed.

The only use of the word “RAID” in Hathorn is as follows:

Another data back-up alternative that overcomes the need to double the storage devices involves writing data to a redundant array of inexpensive devices (RAID) configuration. In this instance, the data is written such that the data is apportioned amongst many DASDs. If a single DASD fails, then the lost data can be recovered by using the remaining data and error correction procedures. Currently there are several different RAID configurations available.

Ex. 1005, 2:4–11. Hathorn describes that a mirroring RAID is useful for device failures, not system failures, because that type of back-up method results in the primary and secondary DASD having the same serial number. *Id.* at 2:14–17. For this reason, Hathorn turns to a “remote dual copy system.” *Id.* at 7:57–8:16, Fig.3. For example, Figure 3 of Hathorn labels the storage components 323, 326, 333, and 336 as DASDs, which are direct access storage devices, each having its own storage controller. *Id.* Therefore, although we agree that Hathorn discusses mirroring, Hathorn does not employ RAID mirroring. We find, instead, that Hathorn describes mirroring as a known feature, in the Background of the Invention, and instead implements a new copy technique, using dynamic port assignments for either channel or control unit link-level facility. *Id.* at 8:3–15. The evidence is that Hathorn teaches DASDs not implemented as a RAID.

Petitioner argues “[b]oth Mylex and Hathorn disclose RAID 1-type systems (disk mirroring/shadowing).” Pet. 15 (citing Ex. 1006, 12; Ex. 1005, 1:9–12). As was discussed above, that a RAID may also perform the mirroring function does not tend to prove the DASDs of Hathorn are a RAID as claimed. Based on our construction of RAID, we agree with Patent Owner that Hathorn’s disks are not a RAID.

Notwithstanding the lack of a RAID in Hathorn, we separately determine whether Petitioner has provided a sufficient rationale for a person of ordinary skill in the art to combine Hathorn and Mylex. One of the arguments presented involves the allegation that Mylex and Hathorn may be combined based on both being analogous art. Pet. 14–15, Pet. Reply 8–13. That Mylex and Hathorn are in one field is not, by itself, dispositive. See *KSR*, 550 U.S. at 418. We must look to other factors, like design incentives and other market forces, to determine whether the person of ordinary skill would be prompted to make the modification. *Id.*

In reviewing the record here, Petitioner’s arguments in its briefs that Hathorn is analogous art, i.e., in the same field, do not reach, let alone explain, why the person of ordinary skill would be prompted to combine the two. Pet. 14–15, Pet. Reply 8–13, 20. At the oral hearing, Petitioner did not point to any additional argument or evidence on its field of endeavor argument. Tr. 6:14–23, 7:13–14. Conversely, Patent Owner asserted correctly that, even if the field of endeavor is the same, “[y]ou still need some motivation or other rationale to make a combination and that is what is missing in this case.” *Id.* at 47:5–7. Accordingly, Petitioner has not persuaded us that the fact that Mylex and Hathorn are in the same field of endeavor establishes a rationale for combining the two.

b. Close Ownership Relationship of Mylex and Hathorn

Petitioner alleges there is a motivation to combine based on a close ownership relationship because of the common ownership by IBM of Mylex (Mylex Corporation was acquired by IBM) and Hathorn (assigned to IBM). Pet. 14–15 (citing Ex. 1003 ¶ 34). Petitioner argues common sense, i.e., “one skilled in the art reviewing either reference would look to teachings of

related references within this close business relationship.” Pet. Reply 19. As legal authority, Petitioner cites to *KSR*’s statement that: “[r]igid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it.” *Id.* at 19–20 (citing *KSR*, 550 U.S. at 426).

We are not persuaded that the close ownership relationship would prompt the person of ordinary skill to make the proposed combination. Petitioner does not explain how the person of ordinary skill would be motivated to combine the teachings of the references because of the “close ownership relationship” between the two references. Neither are we persuaded that the use of common sense endorsed in *KSR* would form a rationale for making the combination. Other than a common ownership by IBM, there is no factual support for the allegation that a person of ordinary skill would have had the common sense to combine the teachings of these references, at the time of the invention. At best, Petitioner alleges, without factual support, that “later IBM products were partly based on the technology IBM acquired by Mylex.” Pet. 14–15. Even if we regarded the allegation as substantiated with facts, the inference we draw from this allegation is that IBM, at some unknown date, made use of acquired technology in products branded by IBM. Nevertheless, there is no evidence of the alleged activity by IBM being relevant to the Mylex teachings at issue in this proceeding or relevant to the Hathorn system. There is also no evidence of the time frame of these events or to what extent there were modifications. In short, we are not persuaded that later IBM products alluded to by Petitioner is evidence of the motivation to combine the particular teachings at issue in this proceeding. We find the close

relationship allegation proffered by Petitioner in this case an unsatisfactory rationale or motivation to combine Hathorn with Mylex.

c. Whether Both Mylex and Hathorn Disclose Redundant Communication and Mylex Would be Modified According to Hathorn's Teachings

Petitioner asserts that both Mylex and Hathorn describe redundancy and fault tolerance in terms of sending communications between two or more RAID controllers and both disclose RAID 1-type systems (disk mirroring/shadowing). Pet. 15 (citing Ex. 1006, 12; Ex. 1005, 1:9–12); Pet. Reply 20. Petitioner concludes that these similarities would motivate a person of ordinary skill to modify Mylex's heartbeat communication system with the information communication taught by Hathorn, leading to predictable results. Pet. 15. (citing Ex. 1003 ¶¶ 33–34).

Citing to the Horst Declaration, Petitioner contends that “[o]ne of ordinary skill in the art would have been motivated to use [the Hathorn] configuration to achieve the redundancy goals set forth in the Mylex paper ...”. Pet. Reply 20 (citing Ex. 1003 ¶ 118). At the oral hearing, however, Petitioner acknowledged that the heartbeat path of Mylex is just a single path and not a redundant path.¹³ Tr. 17:23–18:12. Also in argument at the oral hearing, Petitioner summarized its position on why one of ordinary skill would combine Hathorn with Mylex: “[s]o for redundancy and cost purposes, one would be inclined to look at Hathorn, realize it teaches that you can change the communication paths and can achieve both of those

¹³ Petitioner cites to the Conte Deposition where Dr. Conte states that Hathorn and Mylex both “disclose redundancy.” Pet. Reply 9 (quoting Ex. 1017, 51:25–53:9). However, Dr. Conte clarifies that both disclose “redundant storage,” as opposed to redundant pathways. Ex. 1017, 44:12–14, 52:5–9.

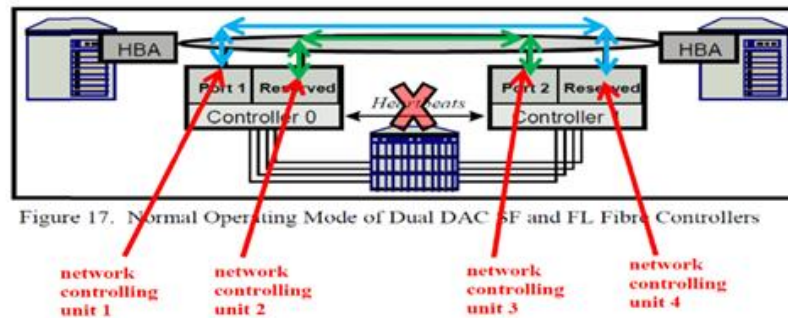
benefits.” *Id.* at 13:3–5. Petitioner also conceded that, other than Figures 2 and 3 of Hathorn (*see* Pet. Reply 12–13), Hathorn does not specifically address redundancy. *Id.* at 18:23–19:14.

The Horst Declaration (Ex. 1003 ¶¶ 33–34), cited by Petitioner at page 15 of its Reply, repeats the field of endeavor and ownership arguments discussed above without any additional factual support for the conclusion that the person of ordinary skill would be motivated to combine Hathorn with Mylex. As such, we give it little weight. *See* 37 C.F.R. § 42.65(a).

Regardless, Patent Owner asserts that the alleged combination is not feasible because Mylex’s reserved ports are inactive until a failover condition is detected. PO Resp. 28–30; *see* Ex. 1006, 18, Fig. 15. According to Patent Owner, it is impossible for both alleged first and fourth network controllers to exchange information, as required by claims 1 and 9, because they are never active at the same time. *Id.* at 29–30 (citing Ex. 2301 ¶¶ 92–96). Patent Owner explains that after a failover in Mylex, the “Reserved” port assumes the ID address for the failed Port 1 or Port 2. *Id.* at 30–31. Therefore, at all times, the Mylex system has only two network controllers exchanging information with each other, even though the two others are on reserve.

Petitioner’s assertion that the Reserved port is a “network controlling unit,” is shown in Petitioner’s annotation of Figure 17 of Mylex. Petitioner’s annotation of Figure 17 is reproduced below.

Petitioner's Annotated Figure 17 of Mylex



Pet. 18. Petitioner argues the above annotation illustrates the alleged exchange of information of claim 1's first and fourth (blue path) and second and third (green path) "network controlling units." *Id.* (citing Ex. 1003 ¶¶ 32, 48–55). Patent Owner contends that this does not meet the limitation because:

In other words, the two ports at the ends of this blue path share the same address/ID. As such, they can never communicate with each other on the network.

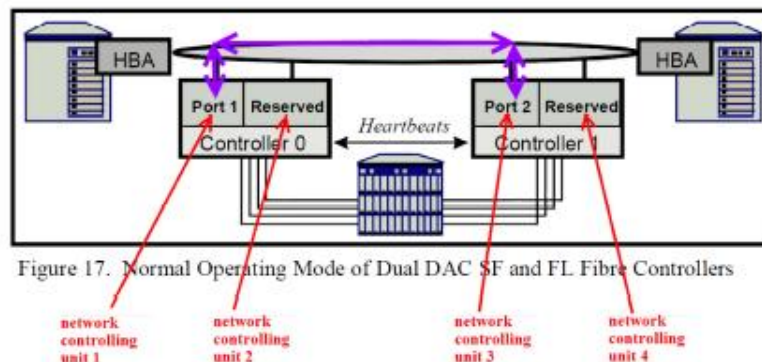
Likewise, the green path [referring to drawing figure] is also an impossible communication path, as the "Reserved" port of Controller 0 is inactive and has no network address/ID before failover.

PO Resp. 30–31.

Patent Owner argues this deficiency in Mylex is not cured by Hathorn because it does not teach activating an inactive port. *Id.* at 30. Petitioner's response to this argument is that there is a motivation to make the modification "so that the expense of the heartbeat path is avoided **by modifying the network interface controlling units to exchange information with each other**, as claimed by the '346 patent." Pet. Reply 13 (citing Ex. 1003 ¶¶ 80, 157; Ex. 2302, 95:12–25). Petitioner alleges that Patent Owner's argument has no substance because the reserved ports can be made addressable. Pet. Reply 17.

Patent Owner takes the next step of showing what would be a feasible modification to Mylex, based on its own annotation of Figure 17, as shown below:

Patent Owner's Annotated Figure 17 of Mylex



PO Resp. 32. Patent Owner argues the path shown in purple in its annotation of Figure 17 of Mylex (communication between Port 1 of Controller 0 and Port 2 of Controller 1) could be used instead of the “Heartbeats” path shown (direct connection between Controller 0 and Controller 1). *Id.* (citing Ex. 2301 ¶ 99). However, as Patent Owner argues, and we agree, this proposed path does not satisfy the language of claim 1 reciting “the first network controlling unit exchanges information with the fourth network controlling unit, and the second network controlling unit exchanges information with the third network controlling unit.” *Id.* “In other words, claim 1 requires the blue path and the green path, not the purple path. Claim 9 uses different language but requires the same.” *Id.* In addition, Patent Owner points out correctly that two communication paths are required by the claim language. *Id.* As previously discussed, Petitioner’s position requires use of the inactive “Reserved” ports to meet the claim language, making the proposed modification not feasible.

Petitioner argues the operability of Mylex's reserved ports being addressable because fibre channel chips can have multiple addresses at different times. Pet. Reply 15 (citing Ex. 1017, 80:22–81:2), 21 (citing Ex. 1006, 14). Further, Petitioner argues Dr. Conte agrees that the address of ports in a fibre channel system could be changed in “multiple ways.” *Id.* at 16. Although Petitioner argues that Hathorn teaches establishing peer-to-peer paths, Petitioner acknowledges that Hathorn does not “specifically disclose the modification of the ports.” See Pet. Reply 16–17; Tr. 25:12–13.

We disagree with how Petitioner has characterized the testimony of Dr. Conte to support Petitioner's contention of a motivation to combine Hathorn with Mylex. The line of questioning of Dr. Conte referred to whether a person of skill in the art would know from the disclosure of the '346 patent how the data is rerouted in the event of a failover. Ex. 1007, 72:9–75:24. Dr. Conte testifies that the way to achieve that in the 2000 time frame was to reconfigure the switch. *Id.* And he clarified that whether a port address in an active network interface controller could be changed was an option “if there was no other facility to change the routing in an active switch.” *Id.* at 79:17–82–2. That is, we are not persuaded that Dr. Conte admitted that the port addressability was achievable under the failover conditions disclosed in Mylex and Hathorn. Neither are we persuaded that Dr. Conte's testimony regarding how a person of ordinary skill would regard the disclosure of the switch operation of the '346 patent switch compels us to find that Mylex and Hathorn would be equally regarded.

Furthermore, we are not persuaded that Hathorn's teaching of peer-to-peer paths, as alleged in the Reply, rebuts the inference of unfeasible communication path drawn from the disclosure of Mylex's “Reserved”

ports. First, the ground of unpatentability at issue relies on modification of Mylex's reserved ports to establish the heartbeat path through a network switch, motivated by Hathorn's communication paths through network switches. See Ex. 1003 ¶¶ 78–80. Petitioner does not allege, nor do we find, that Hathorn teaches or suggests modifying an offline port in a controller to establish a peer-to-peer connection through the network switch. The address of the Hathorn secondary device, although set to zero, is an address nonetheless. See Ex. 1005 at 11:62–12:2. We credit Dr. Conte's testimony that "the storage pertinent controller ports in Hathorn are always active." Ex. 2301 ¶ 116. Petitioner's offer of Hathorn's peer-to-peer connection as some evidence of addressability of ports is incompatible with Mylex's port operation.

Moreover, even if Mylex's "Reserved" ports were to be modified to operate like Hathorn's ports, Petitioner offers no credible explanation of how or why the person of ordinary skill would make modification. The Petition states that the expense of communication paths would be reduced "by *modifying network interface controlling unit ports* to use the existing switch network for communications between RAID controllers (instead of using a direct "heartbeat" path). Pet. 18 (emphasis added). The Declaration of Dr. Horst repeats this general statement *verbatim* with no added factual support or further explanation. See Ex. 1003 ¶ 32.

Furthermore, to the extent Petitioner's declarant testifies that Mylex's ports are *replaced* with or *substituted* by Hathorn's "dynamically modifiable ports," we find the testimony not persuasive. See Ex. 1003 ¶¶ 48–55 (cited in Petition at page 18). Instead, we agree with Patent Owner that Hathorn's ports are not interchangeable with Mylex's ports because of the fundamental

operational differences of these devices. *See* PO Resp. 52–54. For example, we credit Dr. Conte’s testimony that the Hathorn ports operate as endpoints of established links in a circuit-switched network, whereas Mylex’s ports are nodes in a fibre-channel network that use packet-switched communications. Ex. 2301 ¶ 117. Further, we credit Dr. Conte’s testimony that the nature of the heartbeats and disk drive traffic data are different such that the links dedicated to transferring disk drive traffic data would not motivate the elimination of the heartbeat path. *Id.* at ¶¶ 118–119. Lastly, we credit Dr. Conte’s testimony that the transmission protocols in Hathorn and Mylex are different standards, Hathorn’s is IBM’s proprietary technology, and Mylex’s is an open, industry standard. *Id.* at ¶¶ 48, 85. As such, we find that although Hathorn’s controller ports are dynamically modifiable, the modifications are the result of a protocol and link architecture that is unique to Hathorn and not interchangeable with Mylex’s system.

In summary, we are not persuaded that both Mylex and Hathorn disclose redundant communications, as opposed to redundant storage. Therefore, we find unpersuasive Petitioner’s proffered obviousness rationale that relies on redundancy. Notwithstanding the redundancy issue, we are persuaded by Patent Owner’s argument and evidence of record that the proffered rationale of Mylex’s modification, as proposed by Petitioner, is not reasonable. Consequently, we find that a person of ordinary skill would not be prompted to make the proposed modification given the unfeasibility of the proposed redundant communication and the differences in the taught ports of Mylex and Hathorn.

d. Cost as a Motive to Modify Mylex With Hathorn

Petitioner contends that a person of ordinary skill would modify the Mylex direct path for sending the heartbeat messages by substituting a switch network, such as taught by Hathorn, for communication between RAID controllers. Pet. 18 (citing Ex. 1003 ¶¶ 32). This approach, according to Petitioner is less costly than the direct heartbeat path of Mylex. *Id.* (citing Ex. 1003 ¶¶ 32, 48–55). Dr. Horst states that Hathorn teaches that the need for expensive direct controller-to-controller communication, as disclosed by Mylex, is avoided by using the switch network of Hathorn. *Id.*; see Ex. 1003 ¶ 54. Petitioner points to its annotated Figure 17 of Mylex (reproduced above) as illustrative of the proposed combination. *Id.*

As Patent Owner notes, Petitioner’s proposed combination requires modification of Mylex to send the heartbeat message over the fibre loop (football shaped connection between HBAs of Figure 17 above) rather than through Mylex’s private network specifically provided for the heartbeats. PO Resp. 33 (citing Pet. 18, 25–27, 42; Ex. 1003 ¶¶ 32, 76–80, 138). Patent Owner does not dispute that controller-to-controller ESCON (enterprise system connections) described in Hathorn (see Ex. 2301 ¶¶ 83–86) are expensive, but notes that is because the sites are far apart. PO Resp. 34 (citing Ex. 2301 ¶ 103). Mylex, according to Patent Owner, has two co-located RAID controllers, and, thus, the distance expense is avoided. *Id.* (citing Ex. 2301 ¶ 104). Petitioner argues the lower cost motivation in its Reply without pointing to persuasive evidence that we may disregard the distance differences between Hathorn and Mylex. See Pet. Reply 19.

Patent Owner hypothetically proposes that, if one skilled in the art “were motivated to eliminate the direct heartbeat connection and to send the

heartbeats by some other path, then there is another, more apparent path to do so.” PO Resp. 46. That path is via the disk bus illustrated in Figures 23 and 24 of Mylex. *Id.* To the extent that the direct heartbeat path is too costly, the disk channel already exists and is utilized already for cache mirroring. *Id.* (citing Ex. 2301 ¶¶ 108–110).

We agree with Patent Owner that there is no evidence that the proposed cost savings motivation would be applicable to Mylex. PO Resp. 35. We also agree that one of ordinary skill would look to other alternatives, i.e., Mylex alone discloses less expensive ways to communicate between the RAID controllers. Thus, we are not persuaded that cost consideration is a reasonable rationale to combine Hathorn with Mylex.

e. The Combination Would Lead to Predictable Results

Petitioner argues that both Mylex and Hathorn use known techniques and components to achieve predictable results. Pet. 15 (citing Ex. 1006, 15); Ex. 1005, 6:25–34). Petitioner concludes that as a result of their similarity, “one of ordinary skill would have been able to apply the fault tolerance teachings of Mylex to the system disclosed by Hathorn, or the modifying NICs to communicate teachings of Hathorn to the system disclosed by Mylex with predictable results.” *Id.* (citing Ex. 1003 ¶¶ 33–34).

Petitioner argues “predictable results” based in part on *KSR*. See *KSR* 550 U.S. at 416 (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”). Patent Owner acknowledges both references would use unspecified computer equipment. PO Resp. 38. Patent Owner argues that the Petition fails to set forth evidence with specificity. *Id.* For example, Patent Owner contends there is a lack of evidence that “the particular

components [as between Mylex and Hathorn] disclosed were compatible or interchangeable.” *Id.* (citing Ex. 2301 ¶ 111).

In its Reply, Petitioner argues there are “functional and structural similarities” associated with redundant storage systems. Pet. Reply 21. Absent some specificity, we find that Petitioner’s argument is conclusory and lacks factual support sufficient to weigh in favor of a finding of obviousness. *KSR*, 550 U.S. at 418 (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)(internal citation omitted).

Patent Owner argues that the combination of Mylex and Hathorn does not teach “that sending heartbeats over the host-side network, such as a fibre channel network, was known.” PO Resp. 40. Although this argument may go to motivation, it does not relate to a claim element, as Patent Owner proposes. *Id.* at 39 (citing MPEP § 2143(I)(1)).

Nonetheless, we agree with Patent Owner that what was known to Mylex was a direct path transport for heartbeats, and nothing in Hathorn pertains to transporting heartbeats at all. *Id.* at 40. Patent Owner contends that Hathorn’s system has no need for heartbeats, and we agree. *Id.* (citing Ex. 2301 ¶ 112). This fact persuades us that a person of ordinary skill faced with Mylex would not need to consult Hathorn for teachings on improving the heartbeat communication exchange or that there is a problem that would be solved by the combination.

Petitioner’s predictable result argument is also unpersuasive because there is no evidence or argument that a person of ordinary skill would be motivated to make the combination in the first instance. As *KSR* points out:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

KSR, 550 U.S. at 421 (emphasis supplied).

The Petition lacks specific evidence that the claimed invention could be constructed by interconnecting off-the-shelf components in order to lead to a predictable result. *See* Ex. 2301 ¶ 111. We find instructive Dr. Conte's testimony that given the differences between the heartbeats of Mylex and the Hathorn system, customization would have been required. *Id.* The customization would raise additional problems to the person of ordinary skill making the motivation to combine less likely. *Id.* We credit Dr. Conte's testimony in this regard. Therefore, we are not persuaded that Petitioner has met its burden in showing that the combination of Mylex and Hathorn are merely the use of known techniques to achieve a predictable result.

f. Conclusion

Petitioner has failed to show by a preponderance of the evidence that the person of ordinary skill would have been motivated to combine Hathorn with Mylex. Thus, Petitioner has not shown that claims 1–9 would have been unpatentable over Mylex and Hathorn.

III. ORDER

For the reasons given, it is

ORDERED that claims 1–9 of U.S. Patent No. 6,978,346 have not been shown by a preponderance of the evidence to be 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.

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