UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

LS CLOUD STORAGE TECHNOLOGIES LLC,
Patent Owner.

~~IPR2023-00120~~
Patent 10,154,092

PATENT OWNER'S ~~PRELIMINARY~~ RESPONSE TO
PETITION FOR *INTER PARTES* REVIEW

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TABLE OF AUTHORITIES

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EXHIBIT LIST

Exhibit	Exhibit Title
1001	~~Reed~~Gertner (U.S. Pat. No. 10,154,092)
1006	Heil (U.S. Pat. No. 6,173,374)
1007	Nakayama (U.S. Pat. No. 5,920,893)
1008	Gulick (U.S. Pat. No. 5,692,211)
1009	Berman (U.S. Pat. No. 6,118,776)
2001	Declaration of Dr. Hassan Zeino, Ph.D.

I. INTRODUCTION

The Board should ~~decline to institute IPR proceedings as to any Challenged~~determine that Petitioner has not demonstrated that any of challenged claims 1-24 of U.S. Patent No. 10,154,092 ("the '092 Patent") ~~because Petitioner has not demonstrated that any claim is likely to be found~~is unpatentable.

Petitioner has ~~not adequately explained how a person of ordinary skill in the art ("POSITA") would approach the problems in the art solved by the '092 Patent. Additionally, Petitioner has failed to~~, for the reasons provided herein, failed to demonstrate that the cited references anticipate or render obvious every element of any of the Challenged Claims. More specifically, the Petitioner has failed to cite a reference that teaches or ~~suggest (and the primary reference teaches away from~~suggests the element of "a first interface configured to receive input/output (I/O) traffic from a first host device via a dedicated I/O channel, the I/O traffic comprising a read command" and "a processor coupled to [a] cache memory, the processor coupled to [a] storage device via a communication path that is distinct from the dedicated I/O channel, the processor configured to access the cache memory during processing of the I/O traffic."

Accordingly, Patent Owner requests that the Board ~~deny the petition for *inter partes* review~~hold that the challenged claims are patentable over the art cited by the Petitioner.

II. THE ‘’092 PATENT (EXH1001)

A. Overvi

As noted by the Board, (see Paper 7, page 3), the application that issued as ~~The application that issued as~~ the ’092 Patent is a continuation of application No. 13/527,126, filed on Jun. 19,

2012, which is a continuation of application No. 10/382,016, filed on Mar. 5, 2003,

which is a divisional of application No. 09/236,409, filed on Jan. 22, 1999.

~~The '092 Patent is titled "Data Sharing Using Distributed Cache in a Network of Heterogeneous Computers" and discloses a network of PCs that includes an I/O channel adapter and network adapter and is configured for management of a distributed cache memory stored in the plurality of PCs interconnected by the network. EXH1001, Abstract.~~

The '092 Patent discloses a network of PCs including an I/O channel adapter and network adapter configured for management of a distributed cache memory stored in the plurality of PCs interconnected by the network. The use of standard PCs reduces the cost of the data storage system. The use of the network of PCs permits building large, high-performance, data storage systems. EXH1001, Abstract.

(Modified)

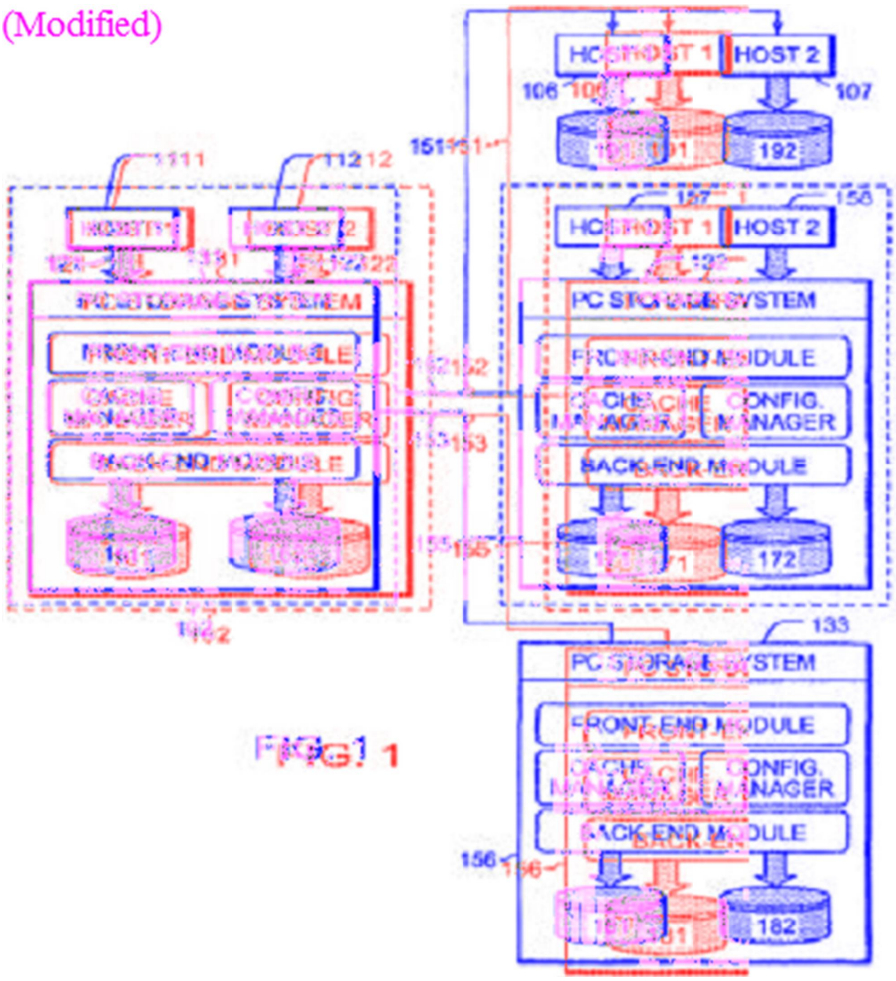


FIG. 1

Figure 1 – ’092 Patent

FIG. 1 of the ’092 Patent, reproduced above, illustrates a network of data storage systems (131, 132, 133). The PC data storage system 131 services a plurality of channel attached host processors 111, 112 using dedicated I/O channels 121, 122, and a plurality of network attached host processors 106, 107 using network link 151, and a plurality of network attached data storage systems 132, 133 using

network links 152, 153. PC storage system 132 services channel attached hosts 157, 158. The '092 Patent describes a node-based approach using an exclusive communication channel *dedicated between two components*, e.g., Host 1 (111) communicates with storage system 131 a central processing unit (CPU) and a peripheral I/O device, over which dedicated input/output requests are transmitted, thus precluding sharing of the channel with other CPUs and peripheral I/O devices. Host 1 is dedicated to using channel 121, while Host 2 is dedicated to using channel 122; Host 1 cannot communicate through channel 122, and Host 2 cannot communicate using channel 121. See EXH1001, col. 5, lines 9-16 and FIG. 1 generally.; see also EXH 2001, ¶ [0027].

Hosts 157 and 158 access data storage system 131 indirectly via network attached data storage system 132, thereby offloading communications protocol overhead from remote hosts 157, 158. Hosts 106 and 107, without a data storage system, directly access storage system 131 via network link 151 thereby incurring communications protocol overhead on hosts 106, 107 and therefore decreasing performance of applications running on those hosts. See EXH1001, col. 5, 17-24; see also EXH 2001, ¶1 [0028].

Host 111 accesses remote disk 181 via local data storage system 131, network link 153, and remote data storage system 133 without incurring protocol overhead on host 111. Host 157 accesses disk 161 via data storage system 133, network link 152,

and data storage system 131 without incurring protocol overhead on host 157. Host 106 directly 30 accesses local disk 161 via network link 151 thereby incurring protocol overhead. See EXH1001, col. 5, 25-34; see also EXH 2001, ¶1 [0028].

B. Claim Construction

According to 37 C.F.R. §42.100(b), in an *inter partes* review, claim terms are construed using the same standard used in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the

prosecution history pertaining to the patent. A person of ordinary skill in the art is defined as having a bachelor's degree in Computer Science, electrical engineering, or highly related field, and would have had at least two years' experience in cyber-security systems.

The ordinary and customary meaning of a term may be evidenced by a variety of sources, including the words of the claims themselves, the specification, drawings, and prior art. However, the best source for determining the meaning of a

claim term is the specification – the greatest clarity is obtained when the specification serves as a glossary for the claim terms. The words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. *In re Zletz*, 893 F.2d 319, 321, 13USPQ2d 1320, 1322 (Fed. Cir. 1989); *Chef America, Inc. v. Lamb-Weston, Inc.,*358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir.2004).

In accordance with these principles, Patent Owner submits that the terms of claims 1-4 (and all other challenged claims) of the '092 Patent are clear on their face. ~~Patent Owner reserves the right to propose further constructions if necessary.~~

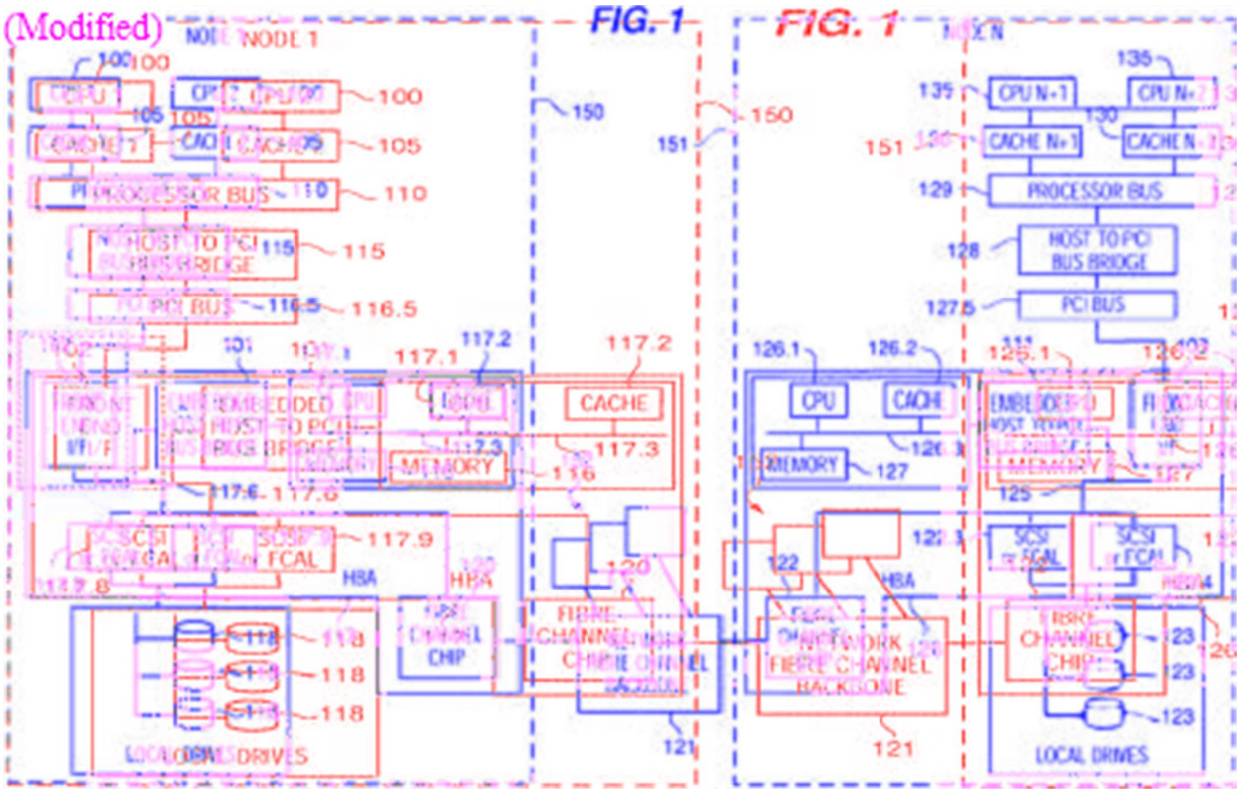
The Board has, however, and not without justification, inferred a discrepancy between Patent Owner's view of the term dedicated channel and the position of the Petitioner. Patent Owner has, with respect, attempted herein to address this discrepancy.

III. THE ASSERTED PRIOR ART

A. Heil (EX1006)

Heil, which Petitioner relies on as its Primary reference, describes a system

that retrieves data across independent computer nodes of a server cluster by providing for "I/0 shipping of block" level requests to peer intelligent host-bus adapters (hereinafter referred to as HBA). EXH1006, Abstract. FIG. 1 of Heil is reproduced below:



Heil - Figure 1

According to Heil, Host bus adapter (HBA) 117 has "embedded intelligence" that allows it to function as an intelligent PCI-to-PCI bridge and as a disk drive controller for local disks 118. The front-end interface 102 is a PCI-to-PCI Bus bridge that connects, via PCI bus 117.6, various peripheral 1/0 devices, such as the local

drives 118 and Fibre Channel Chip 120, to a centralized system PCI bus 116.5. Front-end interface 102 is connected to embedded Host-to-PCI Bus bridge 101 via PCI bus 117.6. The Host-to-PCI Bus bridge 101 adapts the PCI bus 117.6 signals and internal bus 117.3 signals to allow communications with the embedded HBA intelligence. See EXH1006, Col. 6-7.

B. Nakayama (EX100

Nakayama (EXH1007) describes data storage control that enables data on various storage media to be shared among host computers having different host computer input/output interfaces. A control processor checks a host computer interface management table when a write operation is requested by a host computer. See EXH1007, Abstract. FIG. 3 of Nakayama is shown below.

FIG. 3 is a block diagram showing the configuration of a disk subsystem having a cache memory. A disk control 302 is connected to a host computer 300 via a channel control 301 on the host side and is also connected to a host computer 303 via a small computer system interface (SCSI) bus control 304.

FIG. 3

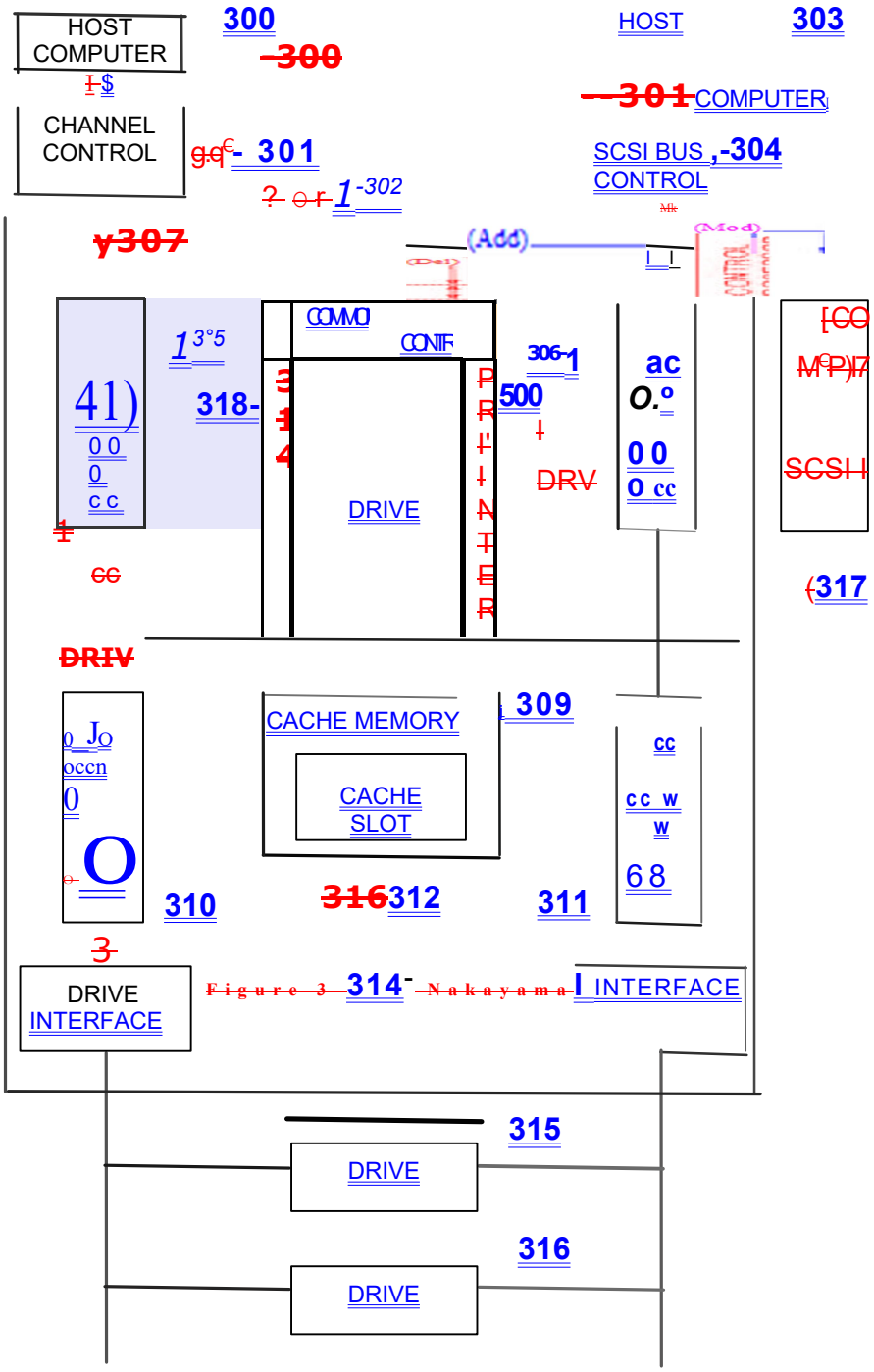
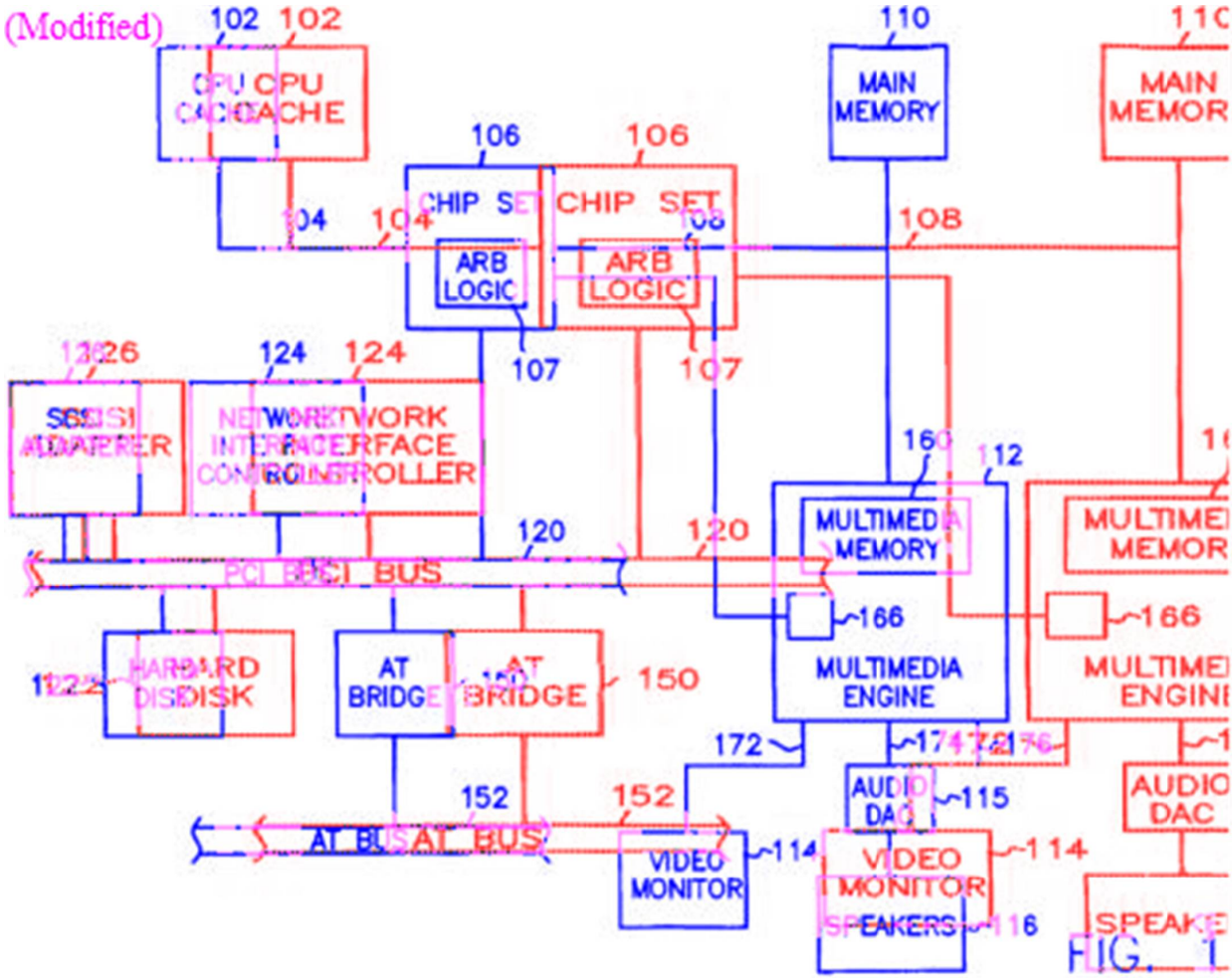


Figure 3 - Nakayama

C. Gulick (EX1008)

which provides "increased performance over [earlier] computer architectures." See EXH1008, Abstract. FIG. 1 of Gulick is reproduced below:



Gulick - Figure 1

Figure 1 shows a block diagram of a computer system. The computer system includes a central processing unit (CPU) cache 102 which is coupled through a CPU local bus 104 to a host/PCI/cache bridge or chipset 106. See EXH1008, col. 4, lines 61-65. The host/PCI/cache bridge 106 and the main memory 110 are coupled via the memory bus 108 to the multimedia engine 112. See EXH1008, col. 5, lines 9-11.

D. Berman (EXH1009)

Berman (EXH1009) is directed to a personalized marketing architecture that uses real-time data and explicit customer input to augment marketing segmentation, analysis and video advertisement delivery. Customer behavior, preferences, and intentions are monitored and identified to present real-time video messages. See Ex.1007, Abstract.

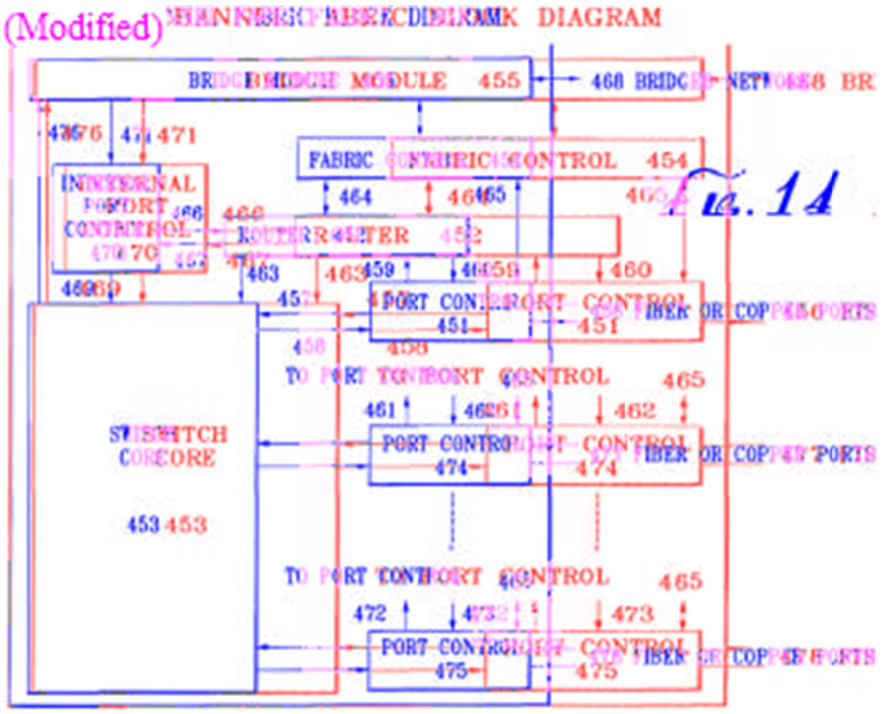


Figure 14 - Berman

FIG. 14 of Berman is reproduced above. FIG. 14 shows a block diagram of the Berman "fabric." The fabric is composed of a fabric control module 454, a fabric router 452, multiple port control modules 451, 474, 475, a switch core module 453, and optionally one or more bridge modules 455. The Fabric Control module 454

controls and configures the rest of the fabric but is not usually involved in the normal routing of frames. See EXH 1009, col. 11, lines 30-36.

IV. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Response, Patent Owner agrees to Petitioner's proffered level of ordinary skill in the art because it comports with the technology and claims of the '092 Patent as well as the asserted prior art.

V. THE PETITION FAILS TO DEMONSTRATE THE CHALLENGED CLAIMS ARE UNPATENTABLE

~~V. The Petition Fails to Demonstrate That There Is a Reasonable Likelihood That Any Challenged Claim is Unpatentable~~

~~Petitioner has failed to carry its burden to show a *prima facie* case of anticipation under 35 U.S.C. § 102 and obviousness under 35 U.S.C. § 103. See Graham v. *Deere Co.*, 383 U.S. 1, 17–18 (1966). The Board has held that a failure to adequately identify the differences between the claimed subject matter and the prior art is fatal to validity challenge. See, *Apple, Inc. v. Contentguard Holdings, Inc.*, IPR2015-00355, Decision Denying Institution of *Inter Partes* Review, Paper 9 at 9-10 (P.T.A.B. June 26, 2015 (denying institution for failure to identify the differences between the claimed subject matter and the prior art).~~

A. Petitioner Fails to Establish in Ground 1 that Challenged Claims ~~1-~~1-3~~3~~, 7-12, and 19-23 are Anticipated by Heil under 35 U.S.C. § 102(e)

1. Claim

1. Independent claim 1 has been divided into elements for consideration by the Petitioner as follows:

[1.pre] An apparatus comprising:

[1.a] a first interface configured to receive input/output (I/O) traffic from a first host device via a dedicated I/O channel, the I/O traffic comprising a read command;

[1.b] a second interface configured to receive first data via a network;

[1.c] a cache memory configured to store second data;

[1.d] a storage device configured to store third data; and

[1.e] a processor coupled to the cache memory, the processor coupled to the storage device via a communication path that is distinct from the dedicated I/O channel, the processor configured to access the cache memory during processing of the I/O traffic,

[1.f] the processor further configured to perform an access operation at the storage device based on the I/O traffic.

a. Element [1.A]

Heil does not disclose or suggest element [1.a].

Claim 1 of the '092 Patent recites "a first interface configured to receive input/output (I/O) traffic from a first host device via a **dedicated** I/O channel, the I/O traffic comprising a read command[.]" (emphasis added).

~~Petitioner argues that Heil describes a first interface that receives I/O traffic~~ As illustrated throughout the '092 Patent, "dedicated I/O channel" refers to an exclusive communication channel dedicated between two components, over which dedicated input/output requests are transmitted, thus precluding sharing of the channel with other CPUs and peripheral I/O devices. There is a 1 to 1 correspondence between each Host (e.g., 112) and each channel (e.g., 122) as illustrated in FIG. 3 of the '092 Patent below.

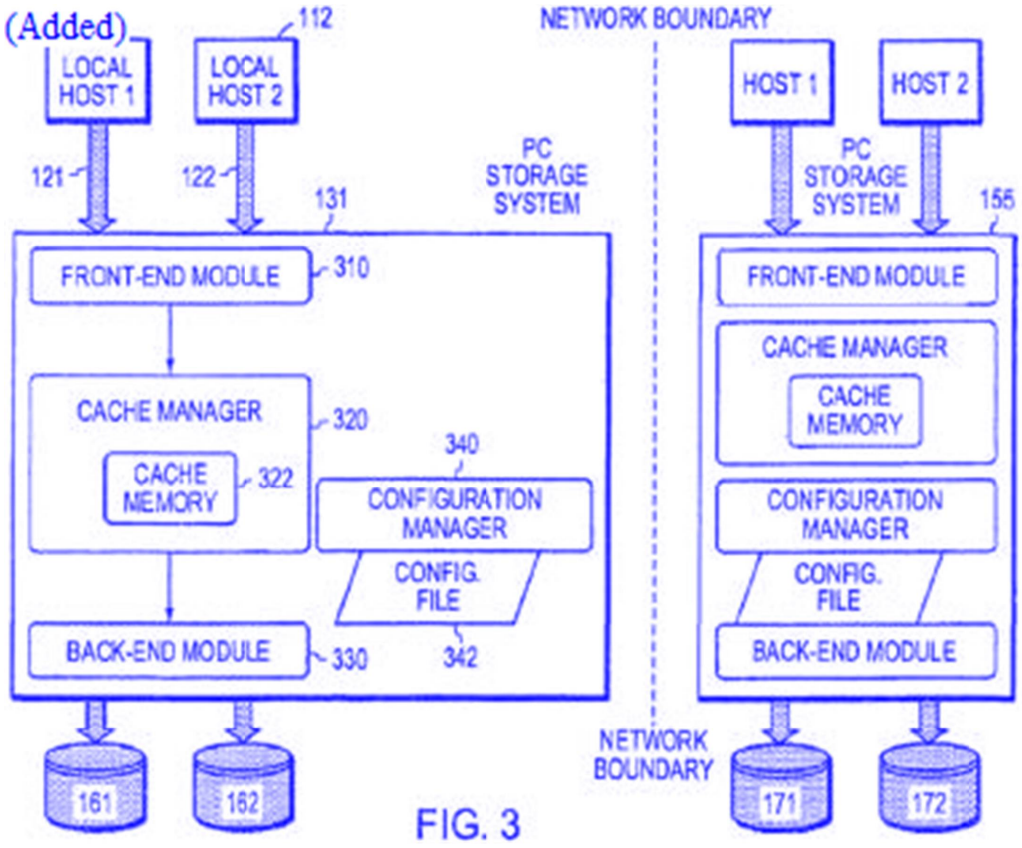
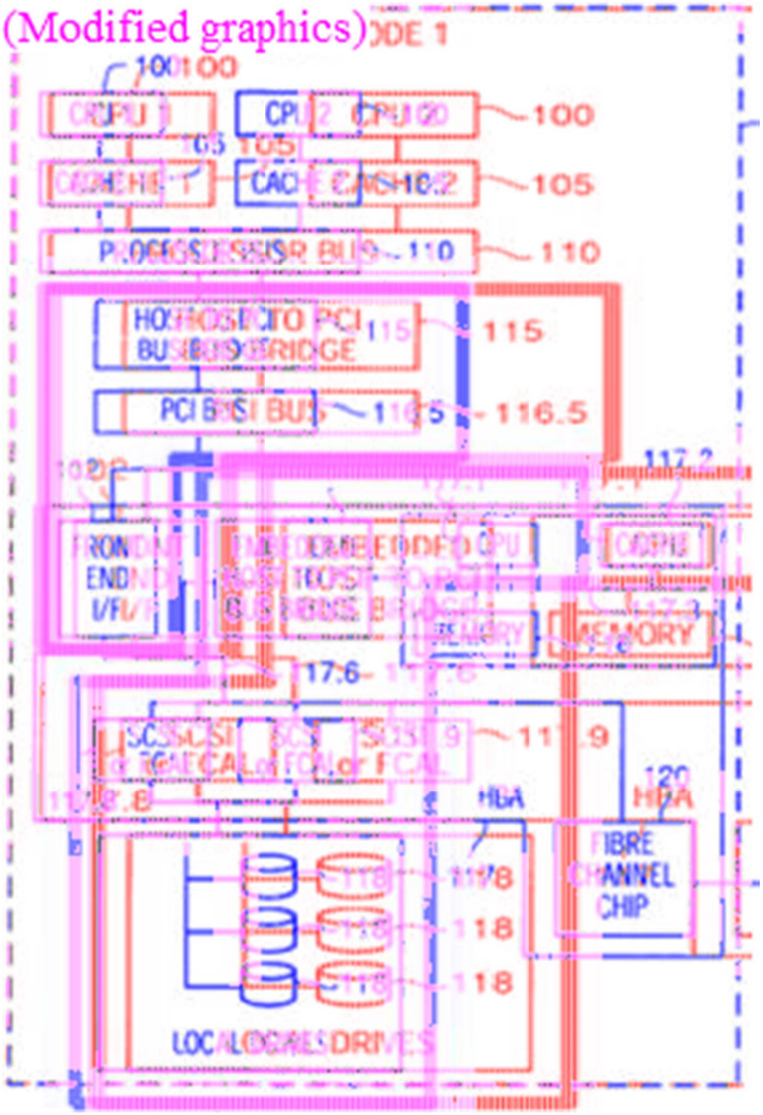


Figure 3 – '092 Patent

There is no sharing of a channel (e.g., Host 1 does not share a channel with Host 2). There is no instance in which a host element shares a communication channel with any other host or other component, save the component with which the host element communicates. Local Host 1 in FIG. 3 physically cannot use channel 122, just as Local Host 2 cannot use channel 121.

Petitioner argues that Heil teaches element [1.a]. In particular, Petitioner argues that Heil describes a first interface that receives I/O traffic from a host device in the form of an interface for a PCI bus bridge 115, PCI bus 116.5, or Front End I/F

102 for receiving input from a host system (CPU 100). See excerpt from FIG. 1 of Heil ~~below~~on the next page.



Heil – Figure 1 (excerpt)

Petitioner maps Node 1's Host system to Patent Owner's claimed "first host" and elements 115, 116. 5 or 102 to "a first interface" to HBA 117. ~~See EXH2001 ¶~~

~~[0046].~~ Petitioner thus maps path 115 to 116.5 to 102 as the dedicated I/O channel of element [1.a]. ~~See EXH2001 ¶ [0046].~~ This mapping is not correct. Indeed, Heil specifically notes that the indicated path (i.e.,

the path including elements 115, 116.5 and 102) is **not dedicated**, to-wit: "As shown in FIG. 1, one HBA services the I/O requests from CPU 1 and CPU2 100. ~~See EXH2001 ¶ [0046].~~ One skilled in the art, however, will recognize the **load sharing benefits** of allowing a plurality of HBAs to service the local and remote I/O requests of CPU 1 and CPU 2 100." Col. 7, lines 36-40. (Emphasis added). ~~See EXH2001 ¶ [0046].~~ Heil thus teaches that the identified path is a **shared path** and that **load balancing and sharing** is advantageous over a dedicated path, and hence **teaches away** from Patent Owner's claimed invention. In particular, Heil teaches use of a shared path and **teaches away from a dedicated I/O channel**, as recited in each of the independent claims of the '092 patent. (See claim 1 element 1.A as an example). Heil does not simply offer an alternative or "preferred" solution, but expressly cautions against the very solution of the claimed invention. ~~See EXH2001 ¶ [0046].~~ Heil's teaching of a shared path is in direct contradiction to a "dedicated" I/O channel.

It can be seen that in this indicated path of Heil: element 115 is a PCI bridge that shares the traffic of and between multiple CPUs 100. This shared communication path cannot in any sense be reasonably characterized as "dedicated." ~~See EXH2001 ¶ [0047].~~

Petitioner asserts "The channel used by the PCI bus bridge 115 and PCI bus 116.5 is a dedicated I/O channel because it is a direct, dedicated connection between the host and the HBA that carries I/O traffic between them. Ex.1006, 6:35-40, 7:~~36~~ 3637~~37~~; Ex.1004, ¶72."

Dr. Franzon declares, "...it is my opinion that a POSITA would understand

that the channel used by the PCI bus bridge 115 and PCI bus 116.5 is a dedicated I/O channel because Heil discloses that I/O traffic between HBA 117 and the Node 1 host system utilizes this communication path and it is a direct, dedicated connection between the host and the HBA that carries I/O traffic between them. (Ex. 1006, 6:35-40, 7:36-37.)" (EXH 1004, paragraph [0072])

Patent Owner respectfully disagrees with Petitioner and Dr. Franzon. Heil does not disclose "a first interface configured to receive input/output (I/O) traffic from a first host device via a dedicated I/O channel." The channel used by the PCI bus bridge 115 and PCI bus 116.5 is used for other communications besides I/O requests, for example arbitrary communications among peer CPUs (Heil, Col. 8, ~~lines~~ lines 8-18) and thus the PCI bus bridge 115 and PCI bus 116.5 simply **cannot be** ~~and~~ and **cannot serve** as a dedicated I/O channel. Heil, at Col 8, lines 8-18 states:

> *In the present invention, each CPU within Node 150, Nodes 152, and Node N 151 does not have direct connectivity to a peer CPU within another node. For example, CPU 1 100 does not communicate directly with CPU N+1 135 in Node N 151. Instead, Node 150, Nodes 152, and Node N 151 are connected via a network communications medium. In the preferred embodiment, a Fibre Channel backbone 121 allows each CPU to be connected to peer CPU's. One skilled in the art will recognize all node-to-node inter-processor communication can occur on this Fibre Channel backbone. 121*

However, the only path to the Fibre Channel backbone 121 from the host system CPUs 100 and remote system CPUs 135 is over PCI bus bridge 115 and PCI

bus 116.5, so PCI bus bridge 115 and PCI bus 116.5 are also used to allow a channel or path for each CPU to be connected to peer CPU's.

Furthermore, at no point does Heil provide any teaching or suggestion of any channel in view of the PCI bus bridge 115 and PCI bus 116.5 as taught by Heil that is dedicated solely to receiving input/output (I/O) traffic from a host device. Heil teaches away from a dedicated I/O channel as claimed.

b. Element [1.E]

Heil does not disclose or suggest element [1.e].

Claim 1 of the '092 Patent recites, "a processor coupled to the cache memory, the processor coupled to the storage device via a communication path that is distinct from the dedicated I/O channel, the processor configured to access the cache memory during processing of the I/O traffic." ~~See EXH2001, ¶ [0049].~~

Petitioner's expert recites, at paragraph 89: "Heil's Figure 1 shows that the communication path from the processor to the storage device—i.e., from the CPU 117.1 to the local drives 118 via a SCSI interface, annotated below in red—is distinct from the dedicated I/O channel[.]"

However, in reference to FIG. 1, Heil indicates, "The front-end interface 102 is a PCI-to-PCI Bus bridge that connects, via PCI bus 117.6, various peripheral I/O devices, such as the local drives 118 and Fibre Channel Chip 120, to a centralized system PCI bus 116.5." See EXH1006, Col. 7, lines 1-4~~; see also EXH2001, ¶ [0059]~~.

It is clear that front-end interface 102 of Heil cannot be described as dedicated. Instead, front-end interface 102 connects to and is shared by various peripheral I/O devices, such as the local drives 118 and Fibre Channel Chip 120, to PCI bus 116.5. Indeed, front-end interface 102 connects Fibre Channel Chip 120, to PCI bus 116.5, and this connection makes front-end interface 102 part of the communication path from the processor to storage device. Thus, **the communication path from the processor to the storage device is not distinct in Heil** as stated by the Petitioner's expert paragraph 89.~~ See EXH2001, ¶ [0052] (emphasis added).~~

Heil ~~teaches away from~~does not teach a dedicated IO channel, because Heil refers to a load sharing to allow multiple HBA to serve one host, "As shown in FIG. 1, one HBA services the I/O requests from CPU 1 and CPU2100. One skilled in the art, however, will recognize, and would recognize, the load sharing benefits of allowing a plurality of HBAs to service the local and remote I/O requests of CPU 1 and CPU 2 100. As a node expands its processing power by adding CPUs,

additional HBAs may be required to service the additional local and remote I/O requests." See EXH1006 Col. 7, lines 36-43.

~~7, lines 36-43; see also EXH2001, ¶ [0053].~~

Thus, one of ordinary skill in the art relying on Heil would have gone in a different direction than the claimed invention and would not have reasonably expected success to proceed on the path resulting in the claimed invention. ~~See EXH2001, ¶ [0054].~~

None of the other references provided by Petitioner teaches a dedicated I/O channel, as claimed. ~~See EXH2001, ¶ [0055].~~ Each of the other cited references fails to remedy the shortcomings of Heil in this regard. See EXH2001, ¶ [0055].

2. Claims 2-3 and 7-12

Heil does not anticipate claims 2-3 and 7-12. Claims 2-3 and 7-12 depend from claim 1. These claims are valid because each depends from valid claim 1 and recites additional subject matter.

3. Claim 19

a. Element [19.A]

Independent claim 19 of the '092 Patent recites "a first interface configured to receive input/output (I/O) traffic from a host computer via a **dedicated I/O channel**, the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof[.]" (emphasis added). Petitioner alleges

that Heil teaches this element for the same reason that Petitioner alleges that Heil teaches element [1.a] of claim 1. See Paper 2, page 41. As demonstrated above however,

Heil does not teach element [1.a]. See EXH2001, ¶ [0057]. Therefore, Heil does not teach element [19.a].

b. Element [19.f]

Independent claim 19 of the ’092 patent also recites “the processor further configured to perform one or more access operations at the storage device based on the I/O traffic, wherein the communication path is distinct from the dedicated I/O

channel[.]" Petitioner alleges that Heil teaches this element for the same reason that

Petitioner alleges that Heil teaches element [1.e] of claim 1. See Paper 2, page 42.

As shown above, Heil does not teach or disclose element [1.e]. See EXH2001, ¶ [0058]. Thus, Heil does not teach element [19.f].

~~3~~4. Claims 20-23

Heil does not anticipate claims 20-23. Claims 20-23 depend from claim 19. Claims 20-23 are valid at least for the reason that each depends from valid claim 19 and recites additional subject matter.

B. Petitioner Fails to Establish in Ground 2 that Challenged Claims 10 and 11 are Anticipated by Heil under 35 U.S.C. § 102(b)

Heil does not anticipate claims 10-11. Claims 10-11 depend from claim 1. Claims 10-11 are valid because each depends from valid claim 1 and recites additional subject matter.

C. Petitioner Fails to Establish in Ground 3 that Challenged Claims 1-3 and 6-24 are Obvious over Heil and Nakayama under 35 U.S.C. § 103(a)

1. Claim 1

As shown above, Heil does not teach or suggest elements [1.a] or [1.e] Nakayama does not cure the deficiencies of Heil with regard to these elements. See EXH2001, ¶ [0061]. Petitioner does not argue that Nakayama teaches or suggests a dedicated I/O channel. As noted, Heil affirmatively teaches away from a dedicated I/O channel as claimed by Patent Owner. See EXH2001, ¶ [0061]. It is improper to

combine references where the references teach away from their combination. Thus, the Petitioner's asserted combination of Heil and Nakayama is not proper. Claim 1 is therefore not obvious, under section 103, in view of Heil and Nakayama.

2. Claims 2-3 and 6-12

Heil and Nakayama do not render claims 2-3 and 6-12 obvious. Claims 2-3 and 6-12 depend from claim 1. Claims 2-3 and 6-12 are valid because each depends from valid claim 1 and recites additional subject matter.

3. Claim 13

Claim 13 of the '092 Patent recites, "receiving input/output (I/O) traffic from a host device via a dedicated I/O channel at a first interface, the I/O traffic comprising a write command[.]" (element [13.a]) Petitioner argues that Heil discloses "receiving input/output (I/O) traffic from a host device via a dedicated I/O

channel at a first interface". As explained above, this assertion is not correct. Heil fails to disclose or suggest the above feature.

Claim 13 of the '092 Patent further recites, "performing one or more access operations at the storage device based on the I/O traffic, the one or more access operations utilizing a communication path between a processor and the storage device, the communication path distinct from the dedicated I/O channel." (Element [13.f]). Petitioner argues that Heil discloses this element [13.f] and refers back to Petitioner's arguments regarding element [1.e].

Heil does not teach or suggest elements [1.a] or [1.e], for the reasons provided above. In fact, Heil teaches away from these claimed features. Nakayama does not cure the deficiencies of Heil with regard to these elements. See EXH2001, ¶1 [0065].

Heil and Nakayama do not and cannot render [13.a] and [13.f] obvious for at least the same reasons that Heil and Nakayama do not render elements [1.a] or [1.e] obvious. The asserted combination of Heil and Nakayam is not proper and cannot be relied on by Petittioner.

4. Claims 14-18

Heil and Nakayama do not render claims 14-18 obvious. Claims 14-18 depend from claim 13. Claims 14-18 are valid because each depends from valid claim 13 and recites additional subject matter.

5. Claim 19

Independent claim 19 of the '092 Patent recites "a first interface configured to receive input/output (I/O) traffic from a host computer via a **dedicated I/O channel**, the I/O traffic comprising one or more read commands, one or more write commands, or a combination thereof[.]" (element [19.a]). Petitioner alleges that Heil teaches this element for the same reason that Petitioner alleges that Heil teaches element [1.a] of claim 1. See Paper 2, page 41. As explained, however, Heil does not teach or suggest element [1.a]. See EXH2001, ¶1 [0068]. On the contrary, Heil teaches ~~away from this element.~~shared channel usage. Heil therefore cannot teach element [19.a].

Independent claim 19 of the '092 patent also recites "the processor further configured to perform one or more access operations at the storage device based on the I/O traffic, wherein the communication path is distinct from the dedicated I/O channel[.]" (Element [19.f]) Petitioner alleges that Heil teaches this element for the same reason that Petitioner alleges that Heil teaches element [1.e] of claim 1. See Paper 2, page 42. Heil does not, however, teach element [1.e], as explained. See EXH2001, ¶ [0069]. Consequently, Heil also does not teach or suggest element [19.f].

As explained, Heil does not teach or suggest elements [19.a] or [19.f]. Nakayama does not cure the deficiencies of Heil with regard to these elements. See EXH2001, ¶ [0070]. Further, the combination of Heil and Nakayam is not proper.

Heil and Nakayama do not render [19.a] and [19.f] obvious for at least the same reasons that Heil and Nakayama do not render elements [1.a] or [1.e] obvious. See EXH2001, ¶ [0071].

6. Claims 20-23

Heil and Nakayama do not render claims 20-23 obvious. Claims 20-23 depend from claim 19. Claims 20-23 are valid because each depends from valid claim 19 and recites additional subject matter.

7. Claim 24

Independent claim 24 of the '092 Patent recites "means for receiving input/output (I/O) traffic from a first host device via a dedicated I/O channel, the I/O traffic comprising a write command; [.]" (element [24.a]). Petitioner alleges that Heil teaches this element for the same reason that Petitioner alleges that Heil teaches element [1.a] of claim 1. See Paper 2, page 64. As demonstrated above, Heil does not teach or suggest element [1.a]. See EXH2001, ¶ [0073]. This claim element is simply missing from Heil ~~and Heil teaches away from this elemet~~. Thus, Heil does not teach element [24.a].

Independent claim 24 of the '092 Patent also recites "means for performing one or more access operations at the means for short-term data storage during processing of the I/O traffic and for performing one or more access operations at

the means for long-term data storage based on the I/O traffic, the means for performing

distinct from the dedicated I/O channel. [.]" (element [24.e]). Petitioner alleges that element Heil teaches this element for the same reason that Petitioner alleges that Heil teaches element [1.e] of claim 1. See Paper 2, page 70-71. For the reasons given, however, Heil does not teach element [1.e]. See EXH2001, ¶ [0074]. Therefore, Heil does not teach element [24.e].

Heil does not teach or suggest elements [24.a] or [24.e], as demonstrated above. Nakayama does not cure the deficiencies of Heil with regard to these elements. See EXH2001, ¶ [0075]. The asserted combination of Heil with any other refence is not proper because Heil teaches away from the claimed elements.

Heil and Nakayama do not render [24.a] and [24.e] obvious for at least the

same reasons that Heil and Nakayama do not render elements [1.a] or [1.e] obvious.

See EXH2001, ¶1 [0075].

D. Petitioner Fails to Establish in Ground 4 that Challenged Claim 4 is Obvious over Heil, Nakayama, and Gulick under 35 U.S.C. § 103(a)

Heil does not teach or suggest elements [1.a] or [1.e], as made clear.

Nakayama does not cure the deficiencies of Heil with regard to these elements. See

EXH2001, ¶1 [0077]. Claim 1 is thus not obvious in view of Nakayama and Heil.

Gulick does not cure the deficiencies of Nakayama and Heil with regard to

claim 1, (See EXH2001, ¶1 [0070], nor does Petitioner claim that Gulick does so.

Heil, Nakayama and Gulick do not render claim 1 obvious. See EXH2001, ¶1

[0079]. Claim 4 depends from claim 1. Further, the asserted combination of Heil, Nakayama, and Gulick is not proper. Claim 4 is valid at least because claim 4 depends from valid claim 1 and recites additional subject matter.

E. Petitioner Fails to Establish in Ground 5 that Challenged Claim 5 is Obvious over Heil, Nakayama, and Berman under 35 U.S.C. § 103(a)

> Heil does not teach or suggest elements [1.a] or [1.e], as demonstrated above.

Nakayama does not cure the deficiencies of Heil with regard to these elements. See EXH2001, ¶1 [0080]. Therefore, claim 1 is not obvious in view of Nakayama and Heil. See EXH2001, ¶1 [0080].

Berman does not cure the deficiencies of Nakayama and Heil with regard to claim 1, (See EXH2001, ¶1 [0081]), nor does Petitioner claim that Berman does so.

Further, the asserted combination of Heil, Nakayama and Berman is not proper because Heil teaches away from the claimed invention.

Heil, Nakayama and Berman do not and cannot render claim 1 obvious. See EXH2001, ¶ [0082]. Claim 5 depends from claim 1. Claim 5 is valid at least because claim 5 depends from valid claim 1 and recites additional subject matter.

VI. CONCLUSION

Claims 1-24 are patentably distinct over the prior art of record. ~~Petitioner has relied on a primary reference Heil that teaches away from each of the independent~~Patent Owner respectfully submits that the Board should find that the challenged claims are

~~claims of the Patent. Patent Owner respectfully requests that the petition for *inter partes* review be denied~~patentable over the art cited by Petitioner.

Respectfully submitted,

RAMEY LLP

~~Dated: February 28, 2023~~ _____ ~~/Jacob B. Henry/~~
~~Jacob B. Henry~~

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~~***LS CLOUD STORAGE TECHNOLOGIES LLC.***~~

CERTIFICATE OF SERVICE

I the undersigned, counsel with the law firm of Ramey LLP, hereby certify that the following statements are true and correct under penalty of perjury,
pursuant to 28 U.S.C.§ 1746:

On February 28, 2023 this PATENT OWNER LS CLOUD STORAGE TECHNOLOGIES LLC, PRELIMINARY RESPONSE TO PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,154,092 were served via email to the addresses below:

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CERTIFICATION OF WORD NUMBER

Counsel for Patent Owner hereby certifies that ~~this PATENT OWNER LS CLOUD STORAGE TECHNOLOGIES LLC, PRELIMINARY RESPONSE TO PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,154,092~~ the foregoing Patent Owner's Response contains ~~4,695~~no more than 6,000 words as calculated using the word count function of Microsoft Word, not including material excluded under 37 C.F.R. 42.24(a)(1).

Date: ~~February 28~~August 16, 2023

~~/Jacob B. Henry/~~*s/William P. Ramey*
~~Jacob B. Henry~~
William P. Ramey, III

CERTIFICATE OF SERVICE

I hereby certify that all counsel of record who have appeared in this case are being served on this day of August 16, 2023, with a copy of the foregoing via e-mail.

/s/William P. Ramey
William P. Ramey, III

Summary report: Litera Compare for Word 11.2.0.54 Document comparison	
Style name: Default Style 2	
Intelligent Table Comparison: Active	
Original filename: 2 - POPR.pdf	
Modified filename: 4 - POR.pdf	
Changes:	
Add	218
~~Delete~~	172
~~Move From~~	0
Move To	0
Table Insert	7
~~Table Delete~~	4
Table moves to	0
~~Table moves from~~	0
Embedded Graphics (Visio, ChemDraw, Images etc.)	12
Embedded Excel	0
Format changes	0
Total Changes:	413