

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC., AMAZON WEB SERVICES, INC., AND
AMAZON.COM SERVICES LLC,
Petitioners,

v.

LS CLOUD STORAGE TECHNOLOGIES LLC,
Patent Owner.

Case: IPR2023-00120, IPR2023-00733¹
Patent: 10,154,092 B2

PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE

¹ This case is joined with IPR2023-00120. Per the Board's order (Paper 14), Petitioner Amazon is authorized to make any such filings related to IPR2023-00120 in the instant proceeding. In addition, Petitioners Google, Microsoft, Cisco, and Patent Owner each filed respective approved Joint Motions to Terminate as to Petitioners Google, Microsoft, and Cisco. Accordingly, Amazon.com, Inc., Amazon Web Services, Inc., and Amazon.com Services LLC, collectively "Amazon," or "the Amazon entities" remain as Petitioners in this proceeding.

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<i>Palo Alto Networks, Inc. v. Selective Signals, LLC</i> , IPR2018-00594, Paper 46 (P.T.A.B. Aug. 8, 2019)	8

LIST OF ABBREVIATIONS

Abbreviation	Description
Pet.	<i>Cisco Sys., Inc. v. LS Cloud Storage Techs. LLC</i> , IPR2023-00733, Paper 1, Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,154,092
POPR	<i>Cisco Sys., Inc. v. LS Cloud Storage Techs. LLC</i> , IPR2023-00733, Paper 9, Patent Owner's Preliminary Response
Institution	<i>Google LLC v. LS Cloud Storage Techs., LLC</i> , IPR2023-00120, Paper 7, Granting Institution for <i>Inter Partes</i> Review
POR	<i>Google LLC v. LS Cloud Storage Techs., LLC</i> , IPR2023-00120, Paper 9, Patent Owner's Response to Petition

LIST OF EXHIBITS

Exhibit Description	Exhibit #
U.S. Patent No. 10,154,092	1001
File History of U.S. Patent No. 10,154,092 (Application No. 14/997,327)	1002
File History of U.S. Patent No. 6,549,988 (Application No. 09/236,409)	1003
Declaration of Dr. Paul Franzon, Ph.D.	1004
CV of Dr. Paul Franzon, Ph.D.	1005
U.S. Patent No. 6,173,374 (“Heil”)	1006
U.S. Patent No. 5,920,893 (“Nakayama”)	1007
U.S. Patent No. 5,692,211 (“Gulick”)	1008
U.S. Patent No. 6,118,776 (“Berman”)	1009
United States District Courts – National Judicial Caseload Profile, https://www.uscourts.gov/sites/default/files/fcms_na_distprofile0331.2022.pdf (accessed September 21, 2022)	1010
Order Staying Case in LS Cloud Storage Technologies, LLC v. Google LLC, 1:22-cv-00853 (W.D. Tex. 2022)	1011
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D. Patterson, G. Gibson, R. Katz, entitled “A Case for Redundant Arrays of Inexpensive Disks (RAID)”. SIGMOD88: International Conference On Management of Data Chicago Illinois USA June 1 - 3, 1988	1014
R. H. Katz, "Network-attached storage systems," Proceedings Scalable High Performance Computing Conference SHPCC92., Williamsburg, VA, USA, 1992, pp. 68-75	1015
Gang Ma and A. L. Narasimha Reddy, "An evaluation of storage systems based on network-attached disks," Proceedings. 1998 International	1016

Exhibit Description	Exhibit #
Conference on Parallel Processing (Cat. No.98EX205), Minneapolis, MN, USA, 1998, pp. 278-285.	
Average Time to Trial for Patent Cases before Judge Yeakel, retrieved from www.docketnavigator.com	1017
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I. INTRODUCTION

The POR largely reproduces the same arguments from the POPR verbatim. The only difference between them is the addition of two paragraphs and a half-dozen clauses directed at the meaning of “dedicated I/O channel.” *See* Ex. 1023. But these additions do not save Patent Owner’s claims.

The POPR implicitly relied on a construction that the Board adopted for its Institution Decision. As the Board recognized, that construction did not distinguish Heil, the prior art reference common to every ground.

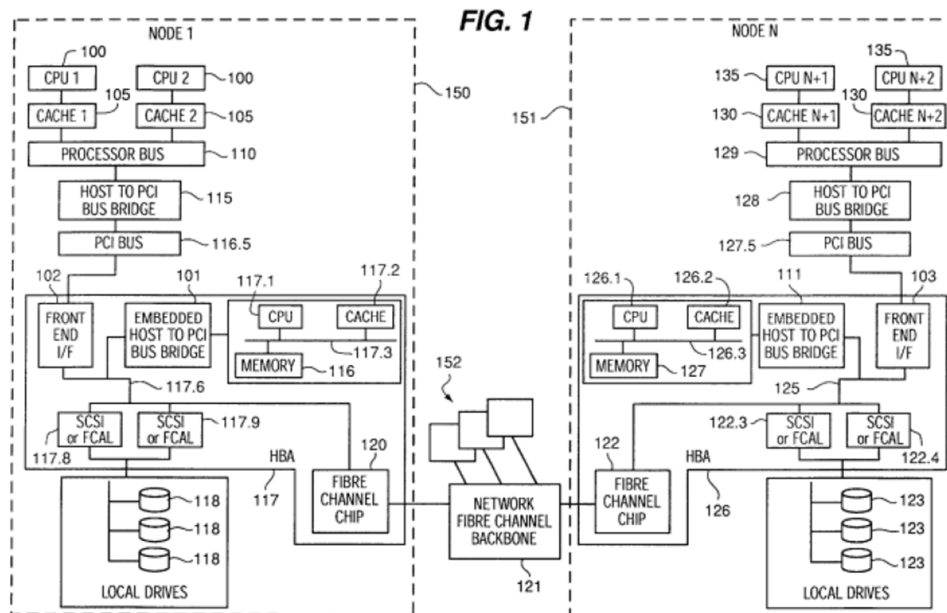
The POR hopes to try again by asking the Board to reinterpret “dedicated I/O channel” to require a connection between only one CPU and only one peripheral I/O device. But there is no evidence to support such a construction, and Heil discloses a “dedicated I/O channel” even under that unsupported construction. Thus, the POR’s two new paragraphs of argument fail to overcome the Petition’s evidence demonstrating that claims 1-24 of the ’092 patent are unpatentable under 35 U.S.C. §§ 102 and 103, and the Board should cancel the challenged claims.

II. ARGUMENT

A. **The Institution Decision correctly found that Heil discloses a “dedicated I/O channel” as preliminarily construed by the Board.**

Heil discloses Element [1.a], *i.e.*, “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.” Ex. 1001 at 9:20-23 (emphasis added);

Pet. at 22-25; *see also* Institution at 14-17. As the Petition explains, Heil discloses the claimed “first interface” (e.g., Front End I/F 102) configured to receive I/O traffic from “a first host device” (e.g., Node 1’s host system), as shown in Figure 1 below:



Ex. 1006, Fig. 1; *see also* Pet. at 22-25. The channel used by the Host-to-PCI bus bridge 115 and PCI bus 116.5 connects the host system and host bus adapter 117.

Ex. 1006 at 6:33-38. That channel is “dedicated” because “it is a direct, dedicated connection between the host and the HBA that carries I/O traffic between them.”

Pet. at 24.

Although the POPR did not formally construe any claim terms, the Board divined a “potential claim construction dispute” from Patent Owner’s assertions. Institution at 14-15. Specifically, Patent Owner contended that Heil’s I/O channel

was not “dedicated” because it is “used for other communications besides I/O requests, for example arbitrary communications among peer CPUs,” i.e., between CPU 1 of Node 1 and CPU N+1 of Node N, for example. *See id.* at 15-16.

The Board identified two potential constructions for “dedicated I/O channel.” *Id.* at 15. The first “require[ed] a node-based approach using an exclusive communication channel *dedicated between two components, e.g., 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.*” *Id.* (emphasis in original). The second was “a channel that is *dedicated exclusively for a certain type of data, i.e., I/O requests, thus encompassing load sharing configurations that share the I/O channel between multiple CPUs and I/O peripheral devices.*” *Id.* (emphasis in original). The Board understood Patent Owner’s argument to rely on the second construction and adopted it for purposes of its Institution Decision despite the patent providing a “somewhat broader description” of the embodiment’s elements. *Id.* at 16-17.

The Board found that “Petitioner shows sufficiently that Heil discloses a ‘dedicated I/O channel’ even under” that construction. *Id.* at 17 (citing *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)). Specifically, the Board rejected Patent Owner’s argument that Heil’s I/O channel must be used for arbitrary communications among peer CPUs in

view of Heil’s teaching that the I/O channel could be used exclusively for I/O traffic and the “arbitrary” inter-CPU communications could be transmitted over a separate network. *Id.* at 27-28 (quoting Ex. 1006 at 8:18-21, 9:11-26). Thus, Heil disclosed Element [1.a] even under Patent Owner’s narrower construction.

B. The POR has not justified another construction for “dedicated I/O channel,” but Heil would anticipate the claims regardless.

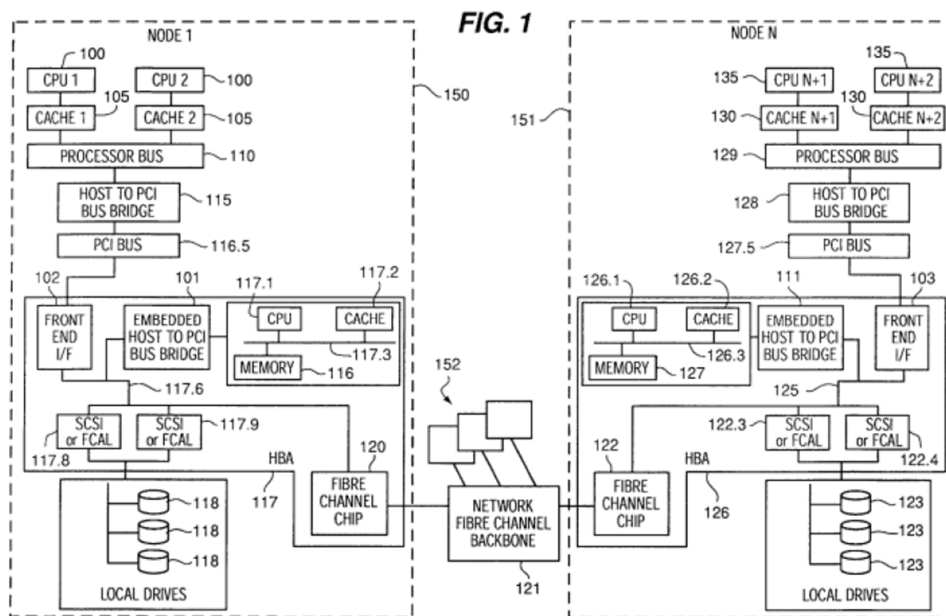
Although the POR contends that the ’092 patent’s claim terms are “clear on their face,” POR at 5, Patent Owner offers an express definition for “dedicated I/O channel” that mirrors—with minor exceptions—the first construction the Board itself proposed but decided not to adopt, as illustrated in the chart below.

The Board’s First Proposed Construction	POR’s Proposed Construction
require[s] a node-based approach using an exclusive communication channel <i>dedicated between two components</i> , e.g., 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	~~require[s] a node-based approach~~ using an exclusive communication channel <i>dedicated between two components</i> , ~~e.g., 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
<i>See</i> Institution at 15.	<i>See</i> POR at 12.

In support of its construction, Patent Owner cites only the same intrinsic evidence that the Board relied on to arrive at its constructions at Institution and is apparent on even cursory review of the ’092 patent. *See* POR at 12-14. Patent

Owner has therefore not provided the Board any basis to deviate from its preliminary construction. Regardless, Heil discloses the claimed dedicated I/O channel under Patent Owner's new construction.

If Patent Owner was merely attempting to invoke the Board's first proposed construction, that construction does not save the claims. Heil satisfies the Board's first proposed construction because it discloses an exclusive communication channel—*e.g.*, Host-to-PCI bus bridge 115 and PCI bus 116.5—dedicated between two components—*e.g.*, Front End I/F 102 and the host system of Node 1 (or the host system's processor bus 110)—over which dedicated input/output requests are transmitted, thus precluding sharing of the channel with other interfaces or hosts/processor buses.



Ex. 1006, Fig. 1.

Patent Owner's modifications to the Board's first proposed construction also do not save the claims. Patent Owner's modifications omit the phrase, "*e.g.*, a central processing unit (CPU) and a peripheral I/O device," from the Board's first proposed construction while retaining that proposed construction's concluding reference to "precluding sharing of the channel with *other* CPUs and peripheral I/O devices." By doing so, Patent Owner may be intending to limit the meaning of "dedicated I/O channel" to a channel running only between *one* "CPU" and *one* "peripheral I/O device" (as opposed to only between two "components").

Patent Owner's modified construction is incorrect for two reasons. First, it is contrary to the evidence. Patent Owner offers no evidentiary basis for limiting "two components" to only one CPU and one peripheral I/O device and none is apparent from the intrinsic record. To the contrary, the '092 patent's specification does not even use the term "CPU" or refer to a central processing unit. Second, such a construction is indefinite. By referring to "*other* CPUs and peripheral I/O devices," the construction necessarily distinguishes from an earlier-referenced CPU and peripheral I/O device. Yet Patent Owner's modification omits the earlier-referenced CPU and peripheral I/O device from the Board's first proposed construction. Thus, one skilled in the art would not be reasonably certain what distinction or difference is required by the construction's use of "other."

Heil nevertheless discloses the “dedicated I/O channel” even under Patent Owner’s narrower, modified version of the Board’s first proposed construction. Patent Owner interprets that term to require only *one* CPU and *one* peripheral I/O device with the hope that it distinguishes Heil’s I/O channel (e.g., Host-to-PCI bus bridge 115 and PCI bus 116.5), which is depicted between *two* CPUs (CPU 1 and CPU 2 of the single host system) and one peripheral I/O device (e.g., HBA 117). But Heil discloses that its host system may include only *one* CPU, Ex. 1006 at 6:37-39 (“The host system *includes one* or more Central Processing Units.” (emphasis added)). Thus, Heil discloses the narrower requirements of Patent Owner’s unsupported construction as well.

Accordingly, Heil discloses the claimed “dedicated I/O channel,” whether that term is interpreted according to the Board’s first proposed construction, the Board’s second proposed construction, or Patent Owner’s modified construction.

C. Patent Owner’s remaining arguments should be rejected as they are identical to those the Board found unpersuasive in Patent Owner’s Preliminary Response.

Patent Owner’s arguments are otherwise a word-for-word reproduction of the POPR’s arguments and should be rejected on the same grounds the Board identified in its Institution Decision. *See, e.g., Google LLC v. Uniloc 2017 LLC*, IPR2020-00756, Paper 30 at 51 (P.T.A.B. Oct. 12, 2021) (rejecting arguments made in POR that were previously made in POPR and rejected); *Miami Int’l*

Holdings, Inc. v. Nasdaq, Inc., CBM2018-00030, Paper 65 at 16-17 (P.T.A.B. Oct. 3, 2019) (“In its [POR], Patent Owner reasserts its [POPR’s] arguments, substantially word-for-word . . . Patent Owner does not apprise us of any reason to change our determination.”); *Palo Alto Networks, Inc. v. Selective Signals, LLC*, IPR2018-00594, Paper 46 at 10-14 (P.T.A.B. Aug. 8, 2019) (confirming Institution Decision’s analysis where the POR repeated the same arguments from the POPR).

Moreover, Patent Owner cannot introduce new argument or evidence in sur-reply. *See Palo Alto Networks*, IPR2018-00594, Paper 46 at 10-11 (disregarding Patent Owner’s belated sur-reply arguments and evidence).

III. CONCLUSION

Petitioner requests that the Board cancel claims 1-24 of the ’092 patent as unpatentable under 35 U.S.C. §§ 102 and 103.

IPR2023-00733

Dated: December 22, 2023

Respectfully submitted,

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Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE has 1,562 words (as counted by the "Word Count" feature of the Microsoft Word™ word-processing system), exclusive of "a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing."

Dated: December 22, 2023

By: / Brian C. Nash /
Brian C. Nash, Reg. No. 58,105

Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached PETITIONERS' REPLY TO PATENT OWNER'S RESPONSE and supporting materials were served on the below date via email (by agreement) to the following counsel of record for Patent Owner:

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