

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

LS CLOUD STORAGE TECHNOLOGIES, LLC,
Patent Owner.

IPR2023-00622
Patent 6,549,988

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

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I. INTRODUCTION

On March 23, 2023, Petitioner Microsoft Corporation (“Petitioner”) submitted a Petition for *Inter Partes* Review (“Petition”) of claims 1-6 of U.S. Patent No. 6,549,988 (“the ’988 Patent”, “Ex. 1001”). Pursuant to 37 C.F.R. § 42.107, LS Cloud Storage Technologies, LLC, (“Patent Owner”) files this Preliminary Patent Owner Response to the Petition, setting forth reasons the Board should deny institution.

Petitioner challenges the patentability of Claims 1-6 of the ’988 Patent based on three (3) different alleged prior art references as follows.

1. U.S Patent No. 6,073,209 (“Bergsten”);
2. U.S Patent No. 6,421,711, (“Blumenau”);
3. Cache Memories, Alan Jay Smith, Computing Surveys, Vol. 14, No. 3, Sept. 1982 (“Smith”).

Petitioner requests institution of the IPR proceeding on the following grounds:

Ground	Claims	Basis
1	1,3	§102 – Bergsten
2	2, 4, 6	§103 – Bergsten
3	2, 4, 6	§103 – Bergsten in view of Blumenau
4	5	§103 – Baumann in view of Smith
5	5	§103 – Baumann in view of Blumenau and Smith

Petitioner fails to establish a reasonable likelihood that the Challenged Claims are unpatentable. Patent Owner will specifically address each of Petitioners arguments in the following sections.

II. OVERVIEW OF THE '988 PATENT

A. Brief Description

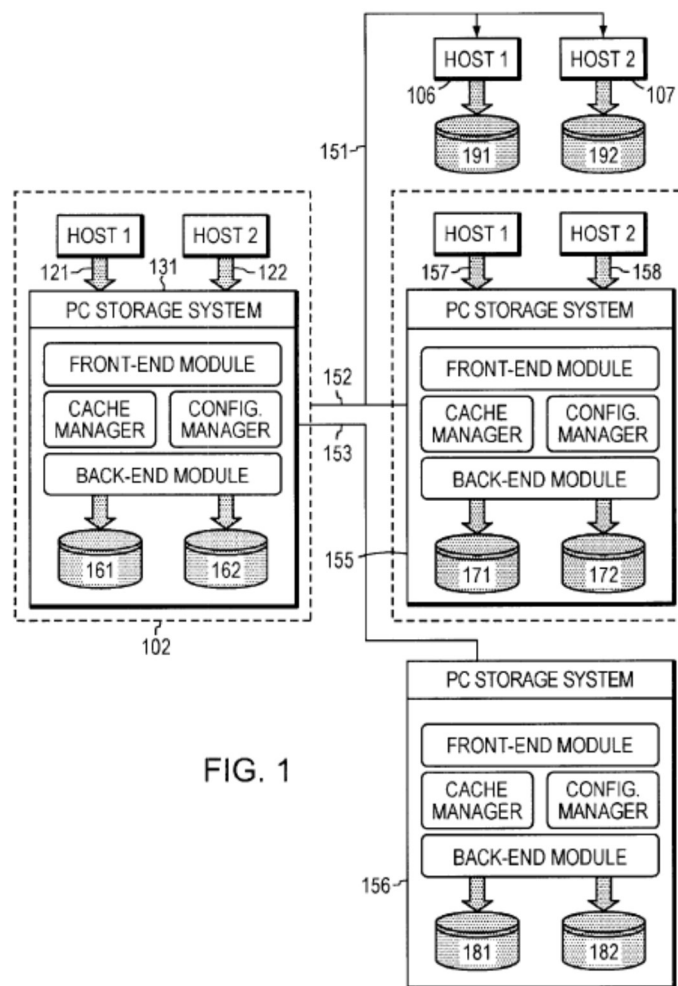
A typical data processing System generally involves a cached data storage system that connects to local host computers via I/O channels or remote host computers via network links. The purpose of the data storage system is to improve the performance of applications running on the host computer by off-loading I/O processing from the host to the data storage system. The purpose of the cache memory in a data storage system is to further improve the performance of the applications by temporarily storing data buffers in the cache so that the references to those buffers can be resolved efficiently as “cache hits.” Ex. 1001, 1:18-28.

Prior art data storage systems are implemented using proprietary hardware and very low-level software, resulting in expensive and not portable systems. In contrast to the prior art systems, the '988 Patent uses standard hardware and software components. Ex. 1001, 1:35-42.

A data Storage System of the '988 Patent comprises a network of PCs each of which includes a cache memory, an I/O channel adapter for transmitting data over the channel and a network adapter for transmitting data and control signals over the

network. A method for managing resources in a cache memory ensures consistency of data stored in the distributed cache. Ex. 1001, 3:57-64.

Figure 1, shown below, illustrates “[t]he PC data storage system 131 services a plurality of channel attached host processors 111, 112 using 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.” EX1001, 4:67-5:6.



'988 Patent – Figure 1

B. Prosecution History

The '988 Patent issued on April 15, 2003, from U.S. Patent Application No. 09/236,409 (“’409 Application”), filed on January 22, 1999. Ex. 1001.

References cited by the applicant and considered by the Examiner include US 6,044,438 (Olnowich), Ex.1002, 80-85. Following an office actions and responses, the Office issued a Notice of Allowance. The Examiner provided reasons for allowance, particularly emphasizing the following limitation of claim 1 as purportedly not taught by the prior art of record: back-end software, responsive to the configuration manager software, for handling reads and writes to disks corresponding to the I/O requests but without communication over the I/O channel adapter, thereby separating disk operations from network and I/O traffic. Ex.1002, 225-230.

C. 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.

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, 13 USPQ2d 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 the '988 Patent are clear on their face, except the following claim term which should be construed as follows:

a. Volume Access Table (Claims 2, 4, 5, and 6)

Petitioner purports to construe the term “volume access table” as a table used to store access characteristics of storage volumes. Pet. 11.

Petitioner admits that “Volume access table” was not a commonly known term when the '409 application was filed, and construe the individual words—“volume,” “access,” and “table” based on the plain and ordinary meaning. Then, referring to the specification, Petitioner concludes the as-filed application discloses only that the volume access table is used by configuration manager software to determine an access mode for a read/write request. Pet. 10-11.

In construing a claim term, we look to the words of the claim itself. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996). If the claim term has a plain and ordinary meaning, our inquiry ends. *Id.* If, however, the claim term does not have an ordinary meaning, and its meaning is not clear from a plain reading of the claim, “we turn to the remaining intrinsic evidence, including the written description, to aid in our construction of that term.” *Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1326 (Fed.Cir.2001). As we have said, “the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Vitronics*, 90 F.3d at 1582. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed.Cir.1998).

With these principles in mind, since “volume access table” does not have an ordinary meaning, The construction of the term “volume access table” must align with the patent's description of the invention.

The specification of the '988 Patent describes the volume access table:

Volume access table (450) in FIG. 4 contains a mapping between hosts and volumes specifying an access mode value. If the access mode is set to neither shared nor exclusive configuration manager forwards I/O requests directly to disk. In

addition to the access mode said volume access table may contain other values that help to manager and improve performance of said data storage system. Ex. 1001, 6: 15-21.

		HOSTS 1 2 3 N				
VOL.	1.					
	2.					
	3.					
	M.					
MODE = SHARED/EXCLUSIVE						
450						
VOLUME ACCESS TABLE						

'988 Patent – Figure 4 (Excerpt)

The '988 Patent thus contemplates volume access table is a table used to manage a data storage system, comprising a mapping between hosts and volumes specifying an access mode value. wherein the access mode value is shared or exclusive during cache processing.

The intrinsic record thus clearly indicates the '988 Patent 's precise conception, which here must control the construction.

Patent Owner reserves all rights to raise claim construction arguments in district court and in this proceeding should the Board grant institution.

III. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this Response, PO adopt Petitioner's proffered level of ordinary skill in the art because it comports with the technology and claims of the '988 Patent as well as the asserted prior art.

IV. THE ASSERTED PRIOR ART

A. Bergsten (Ex. 1004)

Bergsten is titled as "data storage controller providing multiple hosts with access to multiple storage subsystems," and is directed to "a storage controller which allows multiple host computer systems at different locations to access any of multiple copies of stored data." EX1004, 3:2-4.

The architecture of the data storage controller is shown in Figure 1 (reproduced on page 9 below).

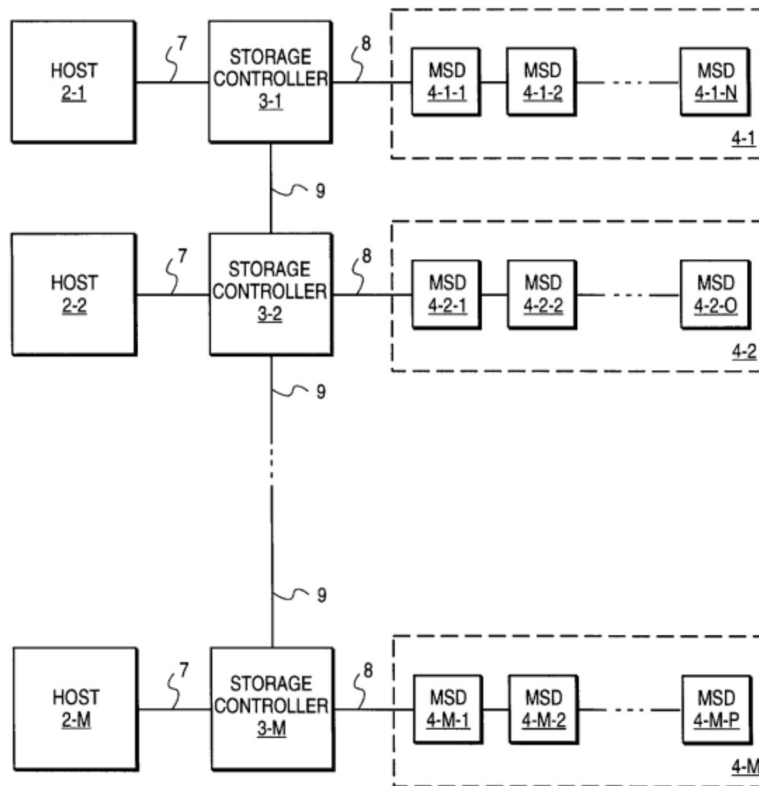


FIG. 1

Bergsten – Figure 1

The system includes multiple storage controllers (3-1 through 3-M) providing multiple host computers (2-1 through 2-M) access to multiple storage arrays (4-1 through 4-M). Each storage array (4-1 through 4-M) includes multiple mass storage devices. The communication paths between hosts and storage controllers may be implemented via any “suitable type of link,” including local area network or Ethernet Ex. 1004, 3:20-50.

At various times, the storage controller must read data from one or more MSDs into its internal memory (“the cache”) or transfer data from the cache to one

or more MSDS, these procedures are known as "staging" and "destaging. Ex. 1004, 10:23-27.

The storage controller performs a standard read operation in response to a request by a host is illustrated in Fig. 14 (Reproduced below).

In step 1401, a storage controller receives a data read request from a host.

In step 1403, if the requested block is cached (Stored in the Storage controller's internal memory 24),

In step 1405, If Exclusive Lock is set or if the block was not cached, then in Step 1411 the Storage controller disconnects from the host, and in Step 1412 a staging task is queued.

In step 1406, If Exclusive Lock was not set in step 1405, then Shared Lock is set and the data is transferred to the host from the cache. Ex. 1004, 12:37-56.

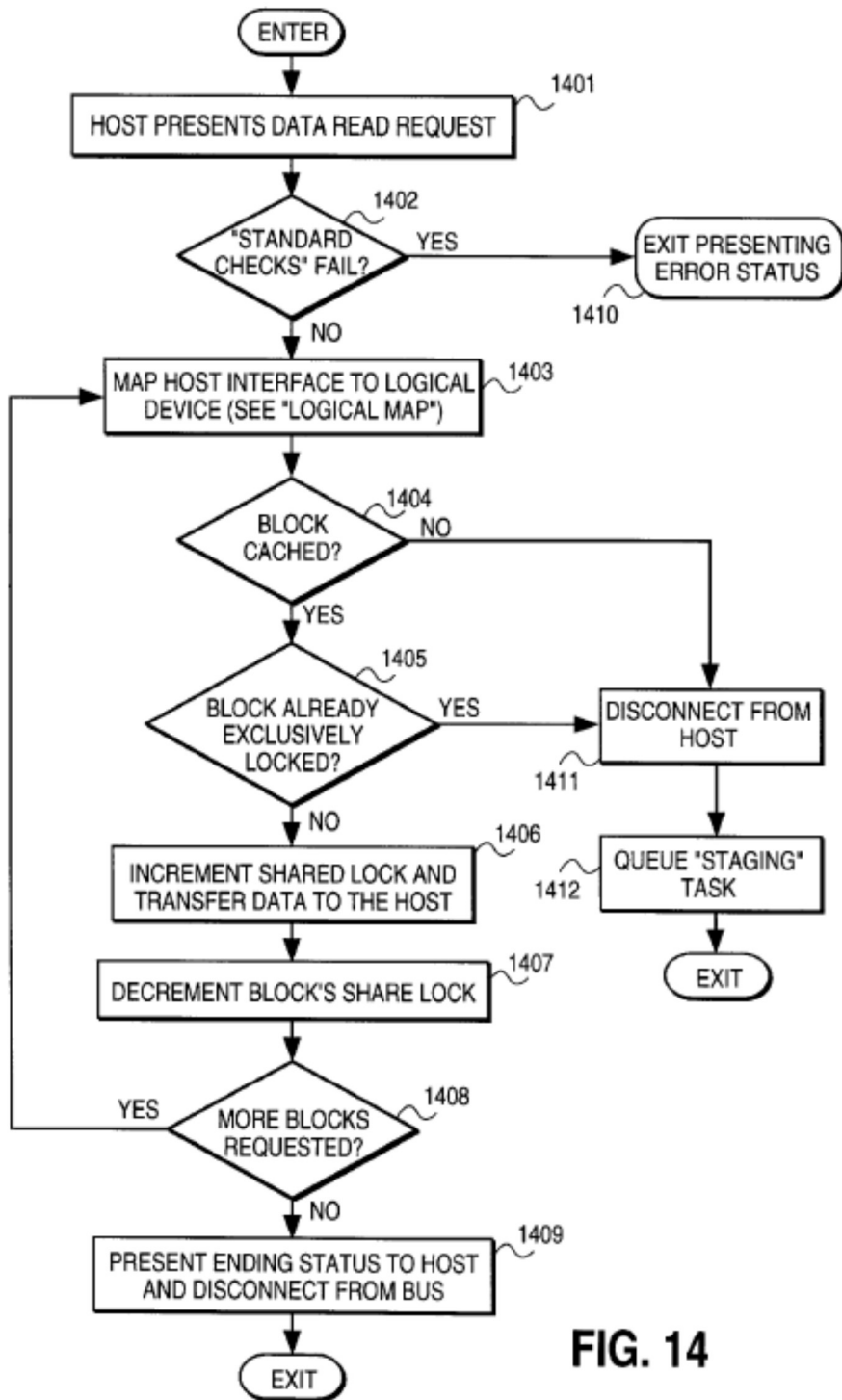


FIG. 14

Bergsten - Figure 14

The storage controller performs a standard write operation in response to a request by a host is illustrated as:

In step 1501, the storage controller receives a write request from a host.

In step 1506, it is determined whether the block is already cached in the storage controller's internal memory 24.

In step 1508, If the block is already cached, and If Exclusive Lock can be obtained, then the data is transferred from the host to the appropriate block in the internal cache 24.

In step 1506, if the block to be written was not already cached, In step 1508, The data is then transferred from the host to the appropriate block in the internal cache 24. Ex. 1004, 13:6-52.

The storage controller performs a staging process as:

In step 1001, the storage controller selects the “nearest” free device housing the data of interest.

In Step 1002 the logical block address of the data is mapped to a physical block address.

In step 1003, the block or blocks are read from the selected device using the physical block address. Ex. 1004, 10:30-45.

B. Blumenau (Ex. 1006)

Blumenau, titled “Virtual Ports For Data Transferring Of A Data Storage System,” discloses a data storage system, including a storage controller that provides

virtual ports for storage access and a virtual switch for routing storage access requests from the physical port to the virtual ports. EX1006, Abstract.

The architecture of the data storage system is shown in Figure 1 (reproduced below).

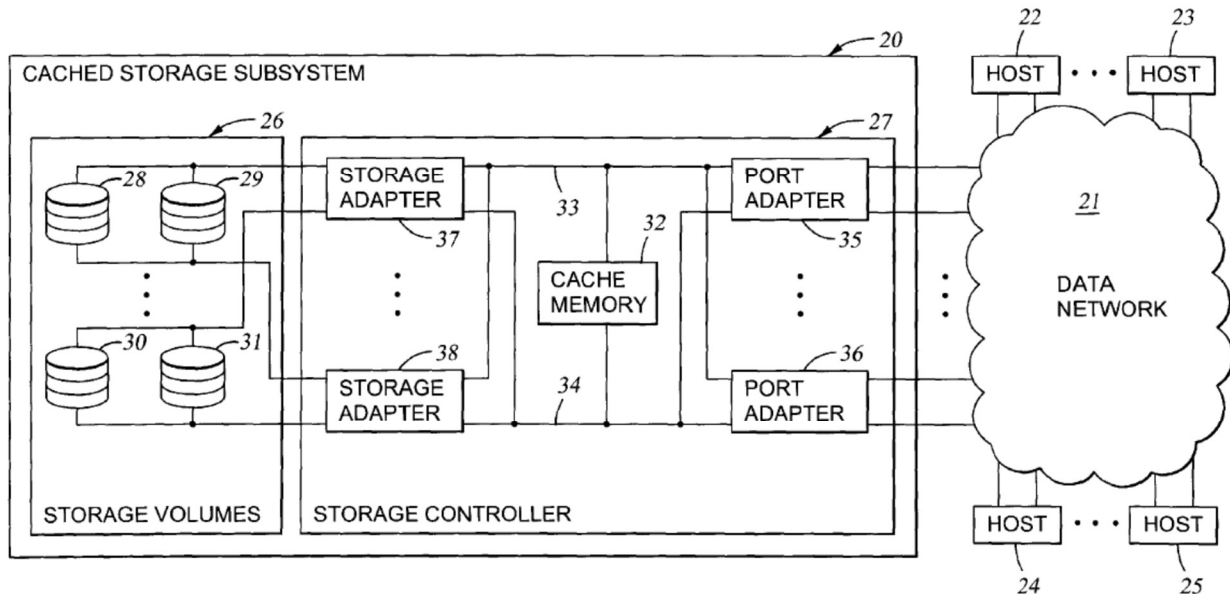


Fig. 1
Blumenau – Figure 1

In the data storage system, a cached storage subsystem 20 connected via a data network 21 to a plurality of hosts 22, 23, 24, 25. The cached storage subsystem 20 includes storage volumes 26 and a storage controller 27 for controlling access of the hosts to the storage volumes. EX1006, 6:64-7:2.

Blumenau describes the operation and function of cache memory as follows:

The storage controller 27 includes a dual port cache memory 32. When a port adapter 35 or 36 receives a storage access request from one of the hosts 22, 23, 24,

25, the port adapter accesses a directory in the cache memory 32 to determine whether or not the data to be accessed resides in the cache memory. If the data to be accessed resides in the cache memory, then the port adapter accesses the data in the cache memory. If the data to be accessed does not reside in the cache memory, then the port adapter forwards a storage access request to the storage adapters 37, 38. EX1006, 7:22-30.

The cache memory 32 ensures that data frequently accessed by the hosts is likely to be found in cache to avoid the data access time of the storage devices and to minimize loading on the storage adapters and the port adapters. EX1006, 7:40-44.

To secure private data, Blumenau uses volume access table for assignment of logical storage volumes to respective host controller ports. The volume access table specifies a correspondence between hosts and respective lists of volumes accessible to the hosts. EX1006, 13:4-6.

C. Smith (Ex. 1015)

Smith discloses “Cache Memories.” in an ACM periodical. EX1015, 473. Smith describes a summary of various aspects of cache memory design and operation, including the cache fetch algorithm (demand versus prefetch), the placement and replacement algorithms, line size, store-through versus copy-back updating of main memory, cold-start versus warm-start miss ratios, multicache

consistency, the effect of input/output through the cache, the behavior of split data/instruction caches, and cache size. EX1015, 473.

Smith specifically describes multicache systems in large modern computer systems having several independent processors, Smith also teaches various design techniques to improve the function of cache memories and multicache systems. EX1015, 504-506.

V. PETITIONER HAS NOT DEMONSTRATED A REASONABLE LIKELIHOOD OF SUCCESS FOR THE GROUNDS ADVANCED IN THE PETITION, AND THE PETITION SHOULD BE DENIED

A. Requirements for Showing Anticipation Under 35 U.S.C. § 102 and Obviousness Under 35 U.S.C. § 103

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051,1053 (Fed. Cir. 1987).

The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The Board has held that a failure to identify the differences between the claimed subject matter and the prior art is fatal to an obviousness 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).

In arriving at an obviousness determination, the Board must sufficiently explain and support the conclusions that the prior art references disclose all the elements recited in the Challenged Claims and a relevant skilled artisan not only could have made, but would have been motivated to combine all the prior-art references in the way the patent claims. *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017). That is, even if all the claim elements are found across a number of references, an obviousness determination must consider whether a person of ordinary skill in the art would have been motivated to combine those references. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1368 (Fed. Cir. 2016); *Los Angeles Biomedical Res. Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly Co.*, 849 F.3d 1049, 1067 (Fed. Cir. 2017) (vacating and remanding an obviousness determination, in part, because the Board did not make factual findings as to whether there was an apparent reason to combine all three prior art references to achieve the claimed invention and whether a POSITA would have had a reasonable expectation of success from such a combination). This combination determination, as supported by an articulated motivation to combine, requires a plausible rationale as to why those prior art references would have worked together.

Broadcom Corp. v. Emulex Corp., 732 F.3d 1325, 1335 (Fed. Cir. 2013). Absent some articulated rationale, a “common sense” finding is no different than the conclusory statement “would have been obvious.” *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017). Of additional importance, “knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references.” *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008).

B. Petitioner Fails to Establish in Grounds 1 and 2 that Challenged Claims 1-4 and 6 are Anticipated by or Obvious Over Bergsten

1. Claim 1

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

[1.1] A computer suitable for use in a data storage system comprising a network interconnecting a plurality of such computers, the computer comprising:

[1.2] an I/O channel adapter for accepting an incoming I/O request from a host;

[1.3] configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache, (ii) to route said request to disk, or (iii) to reject said request;

[1.4] a network adapter for handling network control traffic;

[1.5] a cache memory;

[1.6] front-end software for handling I/O requests arriving at the I/O channel adapter or the network adapter;

[1.7] cache manager software, responsive to said front-end software, for handling data stored in said cache memory; and

[1.8] back-end software, responsive to said configuration manager software, for handling reads and writes to disks corresponding to the I/O requests but without communication over the I/O channel adapter, thereby separating disk operations from network and I/O traffic.

a. Bergsten does not teach the limitation [1.3]

Regarding the limitation [1.3] “configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache, (ii) to route said request to disk, or (iii) to reject said request”, the ’988 Patent describes “configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache” as follows:

...front-end module 310 of FIG. 3 allocates a channel and waits for I/O requests from the initiating hosts 111 or 112. Remote operations begin in step 402. Depending upon the status of the value in a volume access table 450 the requests are routed either as shown in FIG. 4A for write exclusive mode, FIG. 4B for read exclusive, FIG. 4C for write shared or FIG. 4D for read shared. Ex.1001, 6: 4-10.

The ’988 Patent describes “(ii) to route said request to disk” as follows:

Volume access table (450) in FIG. 4 contains a mapping between hosts and volumes specifying an access mode value. If the access mode is set to neither shared nor exclusive configuration manager forwards I/O requests directly to disk. Ex.1001, 15-19.

The language of the limitation [1.3] and corresponding description in the specification shows that (i) to route said request to cache and (ii) to route said request to disk are independent and distinct access processes, which means “to route said request to disk” does not comprises “to route said request to cache”, since “to route said request to disk” is to route said request directly to disk.

To argue that Bergsten discloses “configuration manager software for enabling said I/O channel adapter to decide whether (ii) to route said request to disk,” Petitioner proffers that:

Bergsten further discloses routing the request to disk where, if a requested data block to be read is not cached, the storage controller initiates a staging routine. During the staging routine, the storage controller determines the nearest free storage drive housing the requested data – “nearest” refers to the mass storage device (local or remote) having the smallest access time or earliest availability– and routes the request to that drive to read the requested block and transfer the read data back to the host. (Citing EX1004, 10:30-45, 55-61; EX1003, ¶63. Figure 10), Pet. 21.

Patent Owner respectfully submits that although the storage controller can route the request to disk during the staging routine, it does not route the request to disk directly, on the contrary, the storage controller route the request to disk through cache, the staging process is a step of cache processing. Bergsten describes that the staging process is a step of cache processing as follows:

At various times, the Storage controller must read data from one or more MSDs into its internal memory (“the cache”) or transfer data from the cache to one or more MSDS, these procedures are known as "staging" and "destaging." EX1004, 10:23-27.

Bergsten also describes steps of a routine for performing a standard read operation in response to a request by a host as follows:

In Step 1401, a storage controller receives a data read request from a host.

If the requested block is cached (Stored in the Storage controller's internal memory 24), then it is determined in step 1405 whether Exclusive Lock is set for the requested block.

If Exclusive Lock is set or if the block was not cached, then in Step 1411 the storage controller disconnects from the host, and in Step 1412 a staging task is queued. EX1004, 12:37-27.

The cited portion of Bergsten shows that staging process is contained in the cache process, the staging task is performed when the block was not cached (not hit),

and, in the step of staging, the storage controller routes the request to disk through cache rather than routes the request to disk directly.

Therefore, Bergsten does not disclose the limitation [1.3], particularly, Bergsten does not disclose the limitation “configuration manager software for enabling said I/O channel adapter to decide whether (ii) to route said request to disk.

b. Bergsten does not anticipate claim 1

Petitioner has not met Petitioner’s burden to show how Bergsten teaches the limitation [[1.3], claim 1 is not anticipated by Bergsten, since “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051,1053 (Fed. Cir. 1987).

2. Claim 3

Claim 3 depends from claim 1 and is not anticipated by Bergsten for at least the same reasons.

3. Claim 2

Dependent claim 2 has been divided into elements for consideration by the Petitioner as follows:

[2.1] The system of claim 1 wherein the computers comprise off-the-shelf hardware and operating systems and further comprise:

[2.2] an adapter I/O software for accepting incoming I/O requests from a host;
and

[2.3] a volume access table employed by the configuration manager to ensure consistency of data stored on the network.

a. Bergsten does not teach the limitation [2.3]

To argue that Bergsten discloses the limitation [2.3], Petitioner proffers that:

[a] POSITA would understand that a volume access table is a table used to store access characteristics of storage volumes. Pet. 34.

Bergsten teaches implementing “Exclusive Lock” and “Shared Lock” access modes to ensure data consistency. Pet. 34.

Bergsten discloses storing data structures in the form of “two single-bit binary quantities” (i.e., a binary numeral expressing a 0 or 1 (EX1012, 42, 44-45)) associated with each block of stored data, indicating whether that block is subject to either an Exclusive Lock or a Shared Lock. Pet. 35.

While Bergsten discloses that its **access modes are binary quantities associated with each data block**, Bergsten does not explicitly disclose how the binary access modes are structured and stored in the system of Bergsten. Thus, Bergsten leaves it to a POSITA to implement its access modes according to solutions known in the art. (citing EX1003, ¶88). A POSITA would therefore find it obvious to implement the Exclusive/Shared Lock access mode values of Bergsten **using a**

table mapping each data block with the access mode value associated with that block, because a table is a common, long used, and well-understood data structure for associating one element with another (e.g., for associating a data block and access mode). (citing EX1003, ¶88). Pet. 36.

As set forth in II.C.a, “volume access table” is a table comprising a mapping between hosts and volumes specifying an access mode value. To the extent that “A POSITA would therefore find it obvious to implement the Exclusive/Shared Lock access mode values of Bergsten **using a table mapping each data block with the access mode value associated with that block**”, the table deduced from Bergsten is a table mapping each data block with the access mode value associated with that block, not the table mapping between hosts and volumes specifying an access mode value. Petitioner errs on construing the term “volume access table.” Bergsten does not teach “volume access table” of the limitation [2.3].

b. Bergsten does not render obvious claim 2

Petitioner further argues that:

However, to the extent the Board determines that a “volume access table” requires a mapping between hosts and volumes, a POSITA would also find it obvious to include in such a table what host or hosts hold a specific lock on a given block. *Id.*, ¶90. A POSITA would do so in order for the system to know which devices are currently writing to or reading from a data block and also to know which

devices are currently preventing other devices in the network from writing to or reading to a block. *Id.* (explaining why information would be represented at volume level). Finally, a POSITA would implement the storage controllers of Bergsten to utilize such a table because the storage controller's "OS 20 controls the overall operation of the storage controller, including emulation, data flow, caching of data in the local memory 24, control of data mirroring, and error recovery," (Ex. 1004, 7:29-35) and would therefore control access by a host to a given block based on the access value for that block. EX1003, ¶90. Pet. 38.

Petitioner admits a "volume access table" requires a mapping between hosts and volumes, and thus Bergsten does not disclose "volume access table." Therefore, claim 2 is not obvious over Bergsten, since "Obviousness requires at least a suggestion of all limitations in a claim." *See In re Wada and Murphy, citing CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) and *In re Royka*, 490 F.2d 981, 985 (CCPA 1974).

Bergsten only discloses that its **access modes are binary quantities associated with each data block**, but does not teach to set a mapping between hosts and volumes required by "volume access table" in the '988 Patent. Bergsten teaches implementing "Exclusive Lock" and "Shared Lock" access for each data block, for example, regarding a **data block** is set as an "Exclusive Lock" mode, each host can

hold the **data block** as an “Exclusive Lock”, not **specific hosts set by “volume access table”** can hold the data block.

Even if the storage controllers of Bergsten controls the overall operation of the storage controller, including emulation, data flow, caching of data in the local memory 24, control of data mirroring, and error recovery, Bergsten does not disclose “volume access table”, the storage controllers of Bergsten will at most monitor and record what host or hosts hold a specific lock on a given block, “the record of what host or hosts hold a specific lock on a given block”, as set forth above, is the record that each host hold the **data block** as an “Exclusive Lock” or “Shared Lock”, and is not a “volume access table.”

It is wrong to use the patent in suit as a guide through the maze of prior art references, combining the right references in the right way to achieve a desired result. *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1012, 217 USPQ 193, 199 (Fed. Cir. 1983). Petitioner’s usage of the ’988 Patent’s teaching to explain the combination of prior art references is an obvious exercise in impermissible hindsight.

4. Claim 4

Claim 4 recites: The system of claim 3 further comprising a volume access table employed by the configuration manager to ensure consistency of data stored in the distributed cache.

Claim 4 comprises limitation “volume access table”, similar to claim 2, Bergsten does not disclose “volume access table.” Therefore, claim 4 is not obvious over Bergsten.

5. Claim 6

Independent claim 6 has been divided into elements for consideration by the Petitioner as follows:

[6.1] A method of accessing a remote disk over a computer network without incurring network overhead, the method comprising the steps of:

[6.2] a. causing a local host to issue a request over an I/O channel to a local computer;

[6.3] b. providing a configuration manager on the local computer, the configuration manager routing the request to a remote computer via the computer network;

[6.4] c. causing the remote computer to check the request against a volume access table;

[6.5] d. causing the remote computer to perform an I/O operation on a disk located on the remote computer and to return data to the local computer;

[6.6] e. causing the local computer to provide the returned data to the local host via the I/O channel; and

[6.7] f. causing the local computer to check the data against the volume access table to ensure consistency of the data on the local and the remote computers.

The elements [6.4] and [6.7] comprise limitation “volume access table”, similar to claim 2, Bergsten does not disclose “volume access table.” Therefore, claim 6 is not obvious over Bergsten, the Board should deny Petitioner’s Petition because it has not established its *prima facie* case.

C. Petitioner Fails to Establish in Ground 3 that Challenged Claims 2,4 and 6 are Obvious Over Bergsten in View of Blumenau

1. Claim 2

a. The combination of Bergsten and Blumenau does not teach the limitation [1.3] of claim 1.

As set forth above, Bergsten does not disclose the limitation [1.3].

Blumenau describes the operation of cache memory as follows:

The storage controller 27 includes a dual port cache memory 32. When a port adapter 35 or 36 receives a storage access request from one of the hosts 22, 23, 24, 25, the port adapter accesses a directory in the cache memory 32 to determine whether or not the data to be accessed resides in the cache memory. If the data to be accessed resides in the cache memory, then the port adapter accesses the data in the cache memory. If the data to be accessed does not reside in the cache memory, then the port adapter forwards a storage access request to the storage adapters 37, 38. One of the storage adapters 37, 38 responds to the storage access request by performing

a logical-to-physical translation to determine where the data to be accessed resides on then storage devices, and reads the data from the storage devices and writes the data to the cache memory, for access by the port adapter. The storage adapters 37, 38 also perform a write-back operation to ensure that that data written to the cache memory 32 by the port adapters eventually becomes written to the storage volumes 26. EX1006, 7:22-39.

The cited portion of Blumenau shows that storage controller controls the I/O channel adapter to route the request to cache. Blumenau does not route the request to disk directly or reject the request. Therefore, Blumenau does not disclose the limitation [1.3] “configuration manager software for enabling said I/O channel adapter to decide whether (i) to route said request to cache, (ii) to route said request to disk, or (iii) to reject said request.”

b. The combination of Bergsten and Blumenau does not teach the limitation [2.3] of claim 2

As set forth above, Bergsten does not disclose the limitation [2.3].

To argue that Blumenau teaches the limitation [2.3], Petitioner contends that:

Blumenau expressly discloses a volume access table that includes access values for host computers and their corresponding volumes. EX1006, 13:4-13:6 (“The volume access table specifies a correspondence between hosts and respective lists of volumes accessible to the hosts.”); see also Figs. 5, 8-10.

Moreover, Blumenau's volume access table includes a private/shared flag for an identified mapping of data volumes and host, and a POSITA would understand that such a flag is used to ensure data consistency of data stored in a network. EX1003, ¶122. Blumenau states that "[c]ertain 'private' volumes should be assigned to each host and other hosts should not be permitted to see or modify the private volumes of other hosts." EX1006, 12:2-5. Therefore, setting a private/shared flag to indicate a private volume ensures the consistency of that data across the network by only allowing it to be modified by a single host. EX1003, ¶122.

Patent Owner respectfully submits that petitioner errs on construing the term "volume access table" once again. Although Blumenau and the '988 Patent use the same term "volume access table", it has different meanings.

As set forth above, "volume access table" in the '988 Patent is a table used to manage a data storage system, comprising a mapping between hosts and volumes specifying an access mode value. wherein the access mode value is shared or exclusive during cache processing (it is used by cache manager 320, Ex. 1001, 6:43-45)

"volume access table" in Blumenau is a table which specifies a correspondence between hosts and respective lists of volumes accessible to the hosts, it has no relationship with cache processing.

Blumenau's volume access table includes a private/shared flag for an identified mapping of data volumes and host, the '988 Patent's volume access table includes shared/exclusive access mode. The private/shared flag is not the counterpart of shared/exclusive access mode, since private/shared flag specifies that some data volumes can be accessed by particular hosts, but does not specify the cache mode by particular hosts. On the contrary, shared/exclusive access mode in the '988 Patent specifies the cache mode by particular hosts, but does not specify some data volumes can be accessed by particular hosts. That is, "volume access table" in Blumenau and the '988 Patent has different structures.

The function of the "volume access table" in the '988 Patent is to ensure consistency of data stored in the cache during cache processing, wherein "volume access table" in Blumenau is to ensures security of the private data in the volume (Blumenau states that "[c]ertain 'private' volumes should be assigned to each host and other hosts should not be permitted to see or modify the private volumes of other hosts." EX1006, 12:2-5).

Therefore, although Blumenau and the '988 Patent use the same term "volume access table", they have different structures and functions.

Thus, Petitioner has not met his burden to show how the combination of Bergsten and Blumenau teaches the limitation [2.3].

c. Bergsten in view of Blumenau Does Not Render Claim 2 Obvious

Petitioner fails to undertake an adequate Graham analysis, because Petitioner's combination of Smith and Baumann lacks evidence of crucial limitations of claim 2, such as the elements [1.3] and [2.3]. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Therefore, combination of Bergsten and Blumenau does not render claim 2 obvious because it has not established its *prima facie* case, since “obviousness requires a suggestion of all limitations in a claim.” *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003).

2. Claims 4 and 6

Claims 4 and 6 comprise limitation “volume access table”, similar to claim 2, combination of Bergsten and Blumenau does not disclose “volume access table.” Therefore, claims 4 and 6 are not obvious over Bergsten in view of Blumenau.

D. Petitioner Fails to Establish in Grounds 4 that Challenged Claim 5 is Obvious over Bergsten in View of Smith

Dependent claim 5 has been divided into elements for consideration by the Petitioner as follows:

[5.1] The system of claim 4, wherein the configuration manager includes software that checks an access mode in the volume access table and

[5.2] (i) if the access mode is set to an exclusive mode, causes both reads and writes to be stored in the cache memory, and causes invalidate messages to be sent to remote storage systems;

[5.3] (ii) if the access mode is set to shared, causes only reads to be stored in the cache memory; and

[5.4] (iii) if the access mode is set to a value other than exclusive or shared, causes reads and writes to be performed directly to a disk without using the cache memory.

The combination of Bergsten and Smith does not teach the limitation [5.1]

Limitation [5.1] comprises element “volume access table”, similar to claim 4, Bergsten does not disclose “volume access table”, thus Bergsten does not disclose the limitation [5.1].

Although Smith discloses multicache systems having several independent processors (corresponding to hosts) and caches, EX1015, 504-506, Smith does not disclose multiple data volumes and access mode for the multiple data volumes, thus Smith does not disclose “volume access table” and further, Smith does not disclose the limitation [5.1].

Therefore, the combination of Bergsten and Smith does not render claim 5 obvious because it has not established its *prima facie* case, since “obviousness requires a suggestion of all limitations in a claim.” *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003).

E. Petitioner Fails to Establish in Grounds 5 that Challenged Claim 5 is Obvious over Bergsten in View of Smith and Blumenau

As set forth above, combination of Bergsten and Smith does not teach the limitation [5.1].

As noted above, although Blumenau and the '988 Patent use the same term “volume access table”, they have different structures and functions. Blumenau does not disclose “volume access table” recited in the limitation [5.1].

Therefore, the combination of Bergsten, Blumenau and Smith does not render claim 5 obvious because it does not teach the limitation [5.1].

VI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board deny institution of the Petition in its entirety.

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CERTIFICATION OF WORD NUMBER

Counsel for Patent Owner hereby certifies that the foregoing PRELIMINARY RESPONSE TO PETITION FOR INTER PARTES REVIEW contains no more than 8,000 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: August 24, 2023

/Jacob B. Henry/
Jacob B. Henry

CERTIFICATE OF SERVICE

I hereby certify that all counsel for Petitioner who have appeared in this case are being served on this day of August 24, 2023, with a copy of the foregoing document via e-mail.

/s/ Jacob B. Henry
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