UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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INTEL CORPORATION, CAVIUM, LLC, and DELL, INC.,
Petitioner,

v.

ALACRITECH, INC.,
Patent Owner.

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Case IPR2017-01409
Patent 8,131,880 B2[1]

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Before STEPHEN C. SIU, DANIEL N. FISHMAN, and
CHARLES J. BOUDREAU, *Administrative Patent Judges*.

SIU, *Administrative Patent Judge*.

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

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[1] Cavium, Inc., which filed a Petition in Case IPR2017-01736, and Dell, Inc., which filed a Petition in Case IPR2018-00338, were joined as petitioners in this proceeding. According to updated mandatory notices filed in this proceeding, Cavium, Inc. has now been converted to Cavium, LLC. Paper 74.

I. INTRODUCTION

Responsive to the filed Petition (Paper 1, "Pet."), we instituted an *inter partes* review of all challenged claims (claims 1, 5–10, 12, 14, 16, 17, 20–23, 27, 28, 45, and 55) of U.S. Patent No. 8,131,880 B2 ("the '880 patent," Ex. 1001). Paper 8 ("Dec."). Alacritech, Inc. ("Patent Owner") filed a Corrected Patent Owner's Response (Paper 32, "PO Resp.") and Intel Corporation filed a Petitioner Reply (Paper 42, "Pet. Reply"). Responsive to petitions and requests for joinder filed in IPR2017-01736 and IPR2018-00338, we joined Cavium, Inc. (now Cavium, LLC) and Dell, Inc., respectively, as petitioners in this proceeding. Paper 8 in IPR2017-01736; Paper 9 in IPR2018-00338. According to updated mandatory notices filed in this proceeding, Cavium, Inc. has now been converted to Cavium, LLC. Paper 74. Petitioners Intel Corporation, Cavium, LLC, and Dell, Inc. are identified herein collectively as "Petitioner."

Patent Owner filed a Contingent Motion to Amend (Paper 20), Petitioner filed an Opposition to Patent Owner's Contingent Motion to Amend (Paper 38), Patent Owner filed a Reply to Petitioner's Opposition (Paper 43), and, pursuant to our having granted leave, Petitioner filed a Sur-Reply (Paper 50).

Petitioner filed a Motion to Exclude (Paper 55), Patent Owner filed an Opposition (Paper 60), and Petitioner filed a Reply to Patent Owner's Opposition (Paper 62).

Patent Owner filed a Motion to Exclude (Paper 56), Petitioner filed an Opposition (Paper 59), and Patent Owner filed a Reply to Patent Owner's Opposition (Paper 63).

Patent Owner filed a Motion to Seal (Paper 30).

A transcript of an oral hearing held on September 13, 2018 (Paper 75) has been entered into the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). We base our decision on the preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

Having reviewed the arguments of the parties and the supporting evidence, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims are unpatentable. We also deny Petitioner's Motion to Exclude, dismiss Patent Owner's Motion to Exclude, grant Patent Owner's Motion to Seal, and deny Patent Owner's Contingent Motion to Amend.

THE '880 PATENT (EXHIBIT 1001)

The '880 patent describes a system and method for performing network processing tasks on a network interface card. Ex. 1001, 3:45–47.

ILLUSTRATIVE CLAIM

Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A method of transferring a packet to a host computer system, wherein the packet is received at a communication device from a network, comprising:
> parsing a header portion of a first packet received at a network interface for the host computer system to determine if said first packet conforms to a TCP protocol;
> generating a flow key to identify a first communication flow that includes said first packet, wherein said flow key includes a TCP connection for the communication flow;
> associating an operation code with said first packet, wherein said operation code indicates a status of said first packet,

including whether said packet is a candidate for transfer to the host computer system that avoids processing said header portion by the host computer system in accordance with said TCP protocol; and

processing, by the network interface, said packet according to the TCP connection, including updating a control block representing the TCP connection on the network interface.

Id. at 89:59–90:11.

GROUNDS OF INSTITUTION

We instituted trial on claims 1, 5–10, 12, 14, 16, 17, 20–23, 27, 28, 45, and 55 as unpatentable under 35 U.S.C. § 103 over Thia[2] and Tanenbaum,[3] which is the only proposed challenge to patentability stated in the Petition. Pet. 14.

ANALYSIS

Petitioner argues that the combination of Thia and Tanenbaum discloses parsing a header portion of a packet received at a network interface for a host computer system to determine if the packet conforms to a TCP protocol and generating a flow key to identify a communication flow that includes the packet, wherein the flow key includes a TCP connection for the communication flow, as recited in claim 1. We agree with Petitioner for at least the previously discussed reasons. *See, e.g.*, Dec. 6–8.

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[2] Y.H. Thia and C.M. Woodside, "A Reduced Operation Protocol Engine (ROPE) for a Multiple-Layer Bypass Architecture," 1995 ("Thia," Ex. 1015).

[3] Andrew S. Tanenbaum, *Computer Networks*, Third Edition, 1996 ("Tanenbaum," Ex. 1006).

Claim 1 recites an "operation code" that indicates whether the packet
is a candidate for avoiding processing of the header portion by the host
computer system in accordance with TCP protocol. Petitioner argues that
the combination of Thia and Tanenbaum discloses this feature. For
example, Petitioner argues that Thia discloses determining whether to
"process[] the packet according to . . . fast-path processing bypass [i.e.,
avoiding processing by the host computer system, as recited in claim 1]"
based on "match[ing] the incoming . . . headers with [a] template that
identifies the . . . bypassable headers" or by "a flag [that] is set signifying
that a packet can be fast-pathed." Pet. 47–50. *See also* Dec. 8–9. We agree
with Petitioner. As Petitioner indicates, Thia discloses, for example,
matching a header to identify data packets for "fast-path processing bypass,"
as recited in claim 1.

Patent Owner argues that "Petitioners tacitly admit there is no explicit
disclosure in Thia or Tanenbaum of the claimed 'operation code,'" that
"Thia does not use an 'operation code' for the routing of PDUs," and that
Thia only discloses a "PDU header" that "does not contain the operation
code." PO Resp. 32, 34, 42–43. Patent Owner also argues that "the
obviousness inquiry requires the cited art contain 'suggestion of ***all
limitations*** in the claim.'" PO Resp. 38–39. To the extent that Patent
Owner argues that Thia fails to refer to matching a header to indicate
whether the packet is a candidate for avoiding processing by the host
computer (i.e., fast-path processing) as an "operation code," we are not
persuaded by Patent Owner's argument at least because this is not an
"*ipsissimis verbis*" test. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).
Patent Owner does not explain a sufficient difference between matching a

header to determine if a packet is a candidate for avoiding processing by the host computer (i.e., fast-path processing) of Thia and the claimed "operation code" that is also for determining if a packet is a candidate for avoiding processing by the host computer.

Patent Owner argues that Thia "pass[es] the PDU to the Protocol Processing Engine . . . for processing by the bypass stack" but "does not need to also associate the PDU with an operation code indicating that the PDU is bypassable," and that Thia fails to disclose "associating . . . a component [i.e., an "operation code"] with the PDU." PO Resp. 42–43. To the extent that Patent Owner argues that an "operation code" must be "associated" with a data packet by indicating whether the packet is a candidate for avoiding processing by the host computer system, as recited in claim 1, for example, we agree with Petitioner that Thia discloses this feature for at least the previously discussed reasons. For example, Thia discloses indicating that a packet is bypassable by "match[ing] the incoming PDU headers with a template that identifies the predicted bypassable headers." Ex. 1015, .003. One of skill in the art would have understood that the matching of the header of the packet to a template would have been "associated" with the packet itself. Otherwise, the header of the packet would not have been matched with the template, the packet itself having no "association" with the matching.

Also, as Petitioner points out, Thia discloses,

The "no-in-transit PDU" test can often be avoided. At the beginning of data transfer on a new connection, it is automatically satisfied. It holds as long as no packet fails a bypass test, and it is sufficient to maintain a flag to indicate this. Once a packet fails, and goes to the SPS, then a full "no-in-transit

> PDU" test must be performed for each packet until the test
> succeeds, after which control can go back to the flag.

Ex. 1015, .003. Thus, Thia's flag is used to indicate whether any packet

"fails a bypass test." Once one packet fails the bypass test, requiring

processing by the host protocol stack (SPS), a more complete test (full no-in-

transit PDU) must be performed on each packet until a next packet passes

the full test and the quicker bypass test can be resumed. Therefore, Thia's

flag indicates that the long "no-in-transit PDU" test may be avoided for

packets, in favor of the quicker bypass test, until a packet fails the quick

bypass test. The ordinarily skilled artisan would have understood Thia's

flag is associated with a packet. More precisely, Thia's flag appears to be a

global flag associated with the processing of all received packets rather than

a unique flag associated only with a single corresponding received packet.

However, the claims don't preclude such a global association with all

received packets.

Patent Owner argues that Thia fails to disclose an "operation code," as

recited in claim 1 because, according to Patent Owner, Thia merely

"determin[es] whether . . . there are outstanding packets on the current path"

and is "not about a packet's eligibility for bypass or fast-[path] processing."

PO Resp. 35–37. We agree with Patent Owner that Thia discloses that

"checks are performed to ensure that there are no outstanding packets in the

current path." Ex. 1015, .003. However, we disagree with Patent Owner's

implied argument that because Thia discloses determining "whether . . . .

there are outstanding packets on the current path," that Thia therefore

somehow fails to disclose the "operation code," as claimed. For at least the

previously stated reasons, we agree with Petitioner that Thia discloses this feature.

Patent Owner argues that Thia fails to provide a "disclosure or suggestion of using an operation code to call the BYPASS_START procedure" and that doing so "would have been superfluous and unnecessary in view of Thia's architecture." PO Resp. 39–40. Even assuming Patent Owner's contention to be correct that Thia fails to disclose using an operation code specifically to call a "BYPASS_START procedure," we are still not persuaded by Patent Owner's implied argument that Thia therefore somehow also fails to disclose indicating, with an operation code, whether a packet is a candidate for avoiding processing by the host computer (i.e., fast-path processing). As previously discussed, Thia discloses this feature.

Patent Owner argues that Thia discloses a "*feasibility study* on the *theoretical* benefits of bypassing," and, therefore, according to Patent Owner, discloses "at best . . . an *inoperative* device." PO Resp. 20. We are not persuaded by Patent Owner at least because Thia does not, in fact, disclose that the system is an "inoperative device." Nor does Patent Owner explain the relevance of an embodiment of Thia being "inoperative" or "operative" to whether the combination of Thia and Tanenbaum discloses or suggests the claimed invention under 35 U.S.C. § 103(a). See, e.g., *Symbol Techs. Inc. v. Opticon Inc.*, 935 F.2d 1569, 1578 (Fed. Cir. 1991) ("[A] non-enabling reference may qualify as prior art for the purpose of determining obviousness under § 103.")

Patent Owner argues that "Thia is not directed to . . . TCP/IP, which does not fit the OSI model" and "nowhere discloses that its bypass architecture is compatible with TCP/IP." PO Resp. 26. We are not

persuaded by Patent Owner's arguments. Even assuming Patent Owner's contention to be correct that Thia fails to disclose "TCP/IP," Patent Owner does not assert or demonstrate sufficiently that the combination of Thia and Tanenbaum also fails to disclose or suggest "TCP/IP." For at least the reasons previously discussed, we agree with Petitioner that the combination of Thia and Tanenbaum discloses or suggests this feature. *See e.g.*, Pet. 30–35, 51–57; *see also* Dec. 7.

In any event, we note that Thia discloses a system that is "based on . . . a generalization of Jacobson's 'Header Prediction' algorithm . . . for TCP/IP." Ex. 1015, .002. Patent Owner argues that Thia fails to disclose "TCP/IP" but does not explain why a skilled artisan would not have applied Thia's teachings that generalize from TCP/IP to the specific case of TCP/IP itself.

Patent Owner argues that "Tanenbaum teaches away from performing any TCP/IP protocol processing on anything other than the host CPU" because "Tanenbaum identifies myriad difficulties with implementing TCP header bypass in a chip separate from the host CPU and advises against attempting such an implementation." PO Resp. 28–29 (citing Ex. 1006, .588–.89). However, the cited portion of Tanenbaum discloses that if an effort is made to "avoid having the network coprocessor be as expensive as the main CPU, it is often a slower chip," which results in the "(fast) CPU [being] idle waiting for the second (slow) CPU to do the critical work." Ex. 1006, .588–.589. Hence, contrary to Patent Owner's contention that Tanenbaum discloses "myriad difficulties" with "implementing TCP," Tanenbaum actually discloses that the system may not be optimal if a less "expensive" CPU is selected and the "slow CPU" "do[es] the critical work,"

which does not pertain to "implementing TCP." We are not persuaded by Patent Owner's argument.

With respect to claim 17 and claim 45, Patent Owner argues that the combination of Thia and Tanenbaum fails to disclose an "operation code" and, therefore, cannot "possibly disclose the claimed 'storing said operation code in a control memory" and that "neither Thia nor Tanenbaum discloses an operation code." PO Resp. 44–45. As previously discussed, however, we agree with Petitioner that the combination of Thia and Tanenbaum discloses the claimed "operation code." For example, as Petitioner explains, one of skill in the art would have understood that an operation code would have been stored in a control register of Thia. *See, e.g.*, Pet. 72. See also above discussion.

Claim 55 recites transferring data without transferring the transport layer header. Petitioner argues that Tanenbaum discloses "receiving a second packet . . . where the packet has a transport header and data" and that Thia discloses that "[t]he data portion of a PDU may be physically moved for . . . [c]opying between the adaptor buffer and the host system memory." Pet. 85–87. We have reviewed the cited portions and agree that the combination of Thia and Tanenbaum discloses receiving a second packet having a transport header and data (Tanenbaum) and that the "data portion" of the packet is "physically moved" (or transferred) to the host system memory.

Patent Owner argues that Thia "merely states that the data portion of a packet may be copied" but "does not disclose or even suggest copying the data portion of a PDU ***without transferring*** the corresponding transport layer header." PO Resp. 46–47. However, as Petitioner points out, the

combination of Thia and Tanenbaum discloses receiving a packet with a header and data portion and transferring the "data portion" of the packet to the host system memory. Patent Owner does not assert or demonstrate persuasively that Thia also discloses transferring the "header portion" of the packet to the host system memory. We are not persuaded by Patent Owner's argument. A skilled artisan would have understood that the data portion of the packet is transmitted to the host computer without the header.

Patent Owner does not dispute other claim limitations of claim 1. Patent Owner has accordingly waived any such arguments per the Scheduling Order (Paper 9, 3 ("The patent owner is cautioned that any arguments for patentability not raised in the response will be deemed waived."))

Patent Owner does not dispute the other challenged claims.

Combinability

Petitioner argues that it would have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum. Pet. 30–35. In particular, Petitioner argues that Thia discloses that one of ordinary skill in the art would have known and understood "protocol processing of layered protocols," "would have recognized that OSI and TCP/IP share many similarities," and that the "architecture of the bypass implementation" is used for "any standard protocol." Pet. 30–31; Ex. 1015, .003. Petitioner also argues that Tanenbaum discloses a similar system that "predict[s] [whether] packets are eligible for fast-path processing" including "Header Prediction" and that "TCP implementations use it." Pet. 32 (citing Ex. 1006, .584–.585). Hence, as Petitioner points out, it would have been

obvious to one of ordinary skill in the art to have combined the known process of "header prediction" in "fast-path processing" with "protocol processing of layered protocols" using "any standard protocol' (i.e., Thia) with the known system of "header prediction" in "fast-path processing" (i.e., Thia or Tanenbaum) using "TCP implementations" (i.e., Tanenbaum) as a known "standard protocol" (i.e., Thia and Tanenbaum) to achieve the predictable and expected result of a system for "fast-path processing" using "any standard protocol" such as "TCP implementations." We are persuaded by Petitioner's arguments. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007).

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum because, according to Patent Owner, Tanenbaum discloses a system that "does not introduce a separate processor" but that Thia supposedly discloses a system that has a separate processor. PO Resp. 49. In other words, Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have bodily incorporated the processor of Thia into the system of Tanenbaum (or vice versa). We are not persuaded by Patent Owner's argument at least because "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller,* 642 F.2d 413, 425 (CCPA 1981).

Patent Owner further argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum because "Tanenbaum explains that the lack of interest in OSI was due . . . to 'the enormous complexity of the [OSI] model and the protocols" and that, according to Patent Owner, there was an "undisputed lack of interest in OSI in the relevant timeframe." PO Resp. 51. However, as previously discussed, Petitioner relies on Tanenbaum for disclosing TCP/IP and not OSI. Even assuming Patent Owner's contention to be correct that Tanenbaum supposedly discloses a "lack of interest in OSI," Patent Owner does not assert or demonstrate persuasively that this presumed disclosure regarding an alleged "lack of interest in OSI" sufficiently refutes Petitioner's showing of obviousness of the disputed claims over the combination of Thia and Tanenbaum.

Patent Owner also argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum because Thia allegedly discloses that "its bypass architecture can be used with 'any standard protocol'" but supposedly intends to disclose that "any standard protocol" includes only "OSI protocols" because "Thia refers to concepts and features that are part of the OSI model, not the TCP/IP model." PO Resp. 51. We are not persuaded by Patent Owner's argument at least because Patent Owner does not provide sufficient evidence supporting Patent Owner's allegation that one of skill in the art would have understood that Thia intended to disclose "any OSI protocol" but inadvertently discloses "any standard protocol." We agree with Petitioner (Pet. 30–35 (citing Ex. 1003)) that "Thia's bypass stack is a generalization of the . . . algorithm for TCP/IP" and is not "confined to the OSI protocol." Pet. Reply 9. In

13

addition, we agree that one of ordinary skill in the art, when confronted with the phrase "any standard protocol," as disclosed by Thia, would have understood the phrase to mean "any standard protocol" and would have not instead understood the phrase to mean something else – namely, "any OSI protocol." Even assuming Thia discloses "any standard OSI protocol" (Thia does not disclose this limitation, however), Patent Owner does not sufficiently demonstrate that one of skill in the art would have understood "any standard OSI protocol" to also mean "but not the TCP/IP protocol."

Patent Owner also argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum because Thia supposedly discloses "an easy migration path" by "modify[ing] existing *OSI* stack software" but supposedly fails to disclose "modifying *TCP/IP* stack software." PO Resp. 53. We are not persuaded by Patent Owner's argument at least because the Petitioner's showing of obviousness of the claimed invention is based on the combination of Thia and Tanenbaum and not based on Thia alone.

Secondary Considerations

Patent Owner also argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of Thia and Tanenbaum because there was a "long-felt but unsolved need" "to enhance the efficiency of network protocol processing and network traffic management" and that "[t]he nexus between the long-felt need and the claimed invention" is to "solve[]" "bottlenecks." PO Resp. 54, 56. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 20. We agree with Petitioner that Patent Owner

has not persuasively established any connection between resolution of those bottlenecks and the patented invention. To be accorded substantial weight, there must be a nexus between the claimed invention and the evidence of secondary considerations. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). Nexus is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining nonobviousness. *Demaco Corp. v. F. von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). The burden of showing that there is a nexus lies with the Patent Owner. *See Paulsen*, 30 F.3d at 1482. In the absence of an established nexus with the claimed invention, secondary consideration factors are not entitled to much, if any, weight and generally have no bearing on the legal issue of obviousness. *See In re Vamco Mach. & Tool, Inc.*, 752 F.2d 1564, 1577 (Fed. Cir. 1985). Moreover, to the extent that Patent Owner argues that there was a "long-felt need" to solve "bottlenecks," Patent Owner does not assert or demonstrate persuasively that any of the disputed claims recites "solving bottlenecks." To the extent that Patent Owner argues that indicating when a packet is a candidate to avoid processing by the host computer system, as recited in claim 1, for example, constitutes the required "nexus" to the alleged "long-felt need," we note that Thia previously satisfied this need. The "long-felt need" must not have been satisfied by another before the patentee. *Newell Co. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988).

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the cited references because "the challenged claims . . . enjoyed great commercial

success" by "the offloading . . . technology described in the challenged claims." PO Resp. 56. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 20–21. Patent Owner does not provide sufficient information or evidence to establish that the claimed invention, in fact, experienced "commercial success." In fact, as Petitioner argues, evidence of record indicates that the claimed invention "never went anywhere" and was ultimately "deprecated." Pet. Reply 21 (citing Exs. 1224, 1227, 1230). In any event, even assuming that the claimed invention experienced "commercial success," as Patent Owner alleges, the feature Patent Owner alleges to have resulted in the presumed "commercial success" was previously disclosed by Thia. *See* discussion above. Under these circumstances, any alleged commercial success stems from what was known in the prior art so that there can be no nexus. *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011).

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the cited references because "Alacritech's patent portfolio covering network acceleration techniques was the subject of several successful commercial licenses." PO Resp. 56–57. We are not persuaded by Patent Owner's arguments for at least the reasons set forth by Petitioner. Pet. Reply 21–22. For example, as Petitioner explains, Patent Owner does not demonstrate sufficiently that the alleged licenses were the result of the claimed invention and, therefore, fails to establish a nexus between the claimed invention and the alleged licenses. *See e.g.*, Pet. Reply 21. Rather, as Petitioner points out, the licenses were the result of reasons not related to the claimed invention (e.g., as a result of an infringement lawsuit). Pet. Reply 22 (citing

Ex. 2038). In any event, even assuming that there were "successful commercial licenses," as Patent Owner contends, and the alleged "successful commercial licenses" were the result of some unspecified feature recited in claim 1, for example, as previously discussed, Thia discloses these features. There can be no nexus if the feature relied upon was previously known in the prior art. *Tokai Corp.*, 632 F.3d at 1369.

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the cited references because the claimed invention was alleged to be the subject of industry "praise." PO Resp. 57–58. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 22. For example, Patent Owner argues that various sources stated that Patent Owner's network interface card "is able to sustain network bandwidth," "achiev[es] lower processor utilization," and "is an evolutionary advancement of [Patent Owner's] . . . protocol acceleration" (PO Resp. 58 (citing Ex. 2039 ¶ 4; Ex. 2026 ¶ 183; Ex. 2026 ¶ 184)), but Patent Owner does not demonstrate sufficiently that any of these alleged statements, assuming that any of these statements would have been considered to be "praise" at all, pertain to the claimed invention and in what way. Hence, Patent Owner fails to establish sufficient nexus between the alleged "praise" and the claimed invention.

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the cited references because "prior attempts at 'TCP offload [have] repeatedly failed.'" PO Resp. 58 (citing Ex. 2041, 001–013). We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet.

Reply 23. Even if TCP offload is a form of network processing offload, the Patent Owner provides no evidence linking the failure of others to any limitations of the challenged claims. Also, as Petitioner points out, Thia itself discloses a "generalization of the 'Header Prediction' algorithm for TCP/IP" and that "its teachings are compatible with 'any standard protocol.'" Pet. Reply 9, 11. Patent Owner states that "TCP offload" supposedly "repeatedly failed" but does not explain sufficiently how a system (of Thia) that is based upon an "algorithm for TCP/IP" and applicable to "any standard protocol" (which one of skill in the art would have understood to include TCP because, at least, the Thia system is a generalization of such a system) would have failed. We note that Thia does not disclose that its generalized "TCP/IP" offload system fails.

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the teachings of the cited references because "experts and industry were skeptical of offloading processing of complex protocols." PO Resp. 59. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 23. For example, as previously discussed, Thia, for example, discloses offloading processing of complex protocols. There can be no nexus if the feature relied upon was previously known in the prior art. *Tokai Corp.*, 632 F.3d at 1369. Nor would one of ordinary skill in the art have been "skeptical" of procedures (e.g., offloading) already disclosed in the prior art (e.g., Thia).

Real Parties in Interest

Intel Corporation identifies itself as a real party in interest in these

proceedings and represents that "[n]o other parties exercised or could have exercised control over this Petition; no other parties funded or directed this Petition." Pet. 2. Patent Owner argues that "Dell is . . . Intel's . . .customer and indemnitee," that "Dell, Cavium, and Intel have closely intertwined financial interests and business relationships . . . shared experts . . . and common litigation strategy with respect to their defense" and that, therefore, "the Petition fails to disclose all real parties-in-interest." PO Resp. 61–63.

We note that Dell and Cavium are parties in the present proceeding. We are therefore not persuaded by Patent Owner's argument.

PETITIONER'S MOTION TO EXCLUDE

Patent Owner filed a Declaration of Kevin Almeroth, Ph.D. (Ex. 2026). Petitioner moves to exclude portions of Exhibit 2026 because, according to Petitioner, portions of Exhibit 2026 "are identical to the arguments in the" Patent Owner's Corrected Response to the Petition and, "[when] counsel for Petitioner asked [Patent Owner's expert, Dr. Almeroth] why portions of the Patent Owner's oppositions were identical to the expert's purported declaration . . . Counsel for Patent Owner instructed Dr. Almeroth not to answer on the basis of privilege." Paper 55, 2–4.

However, we agree with Patent Owner that "Petitioner's complaints go to the weight of Dr. Almeroth's opinions and not their admissibility." Paper 60, 4. Accordingly, Petitioner's motion to exclude is denied.

PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner moves to exclude Exhibit 1006 and Exhibit 1011 because, according to Patent Owner, "Exhibit 1006 . . . is irrelevant" and

Exhibit 1011 is allegedly "inadmissible layman opinion." Paper 56, 2.

The Final Decision does not rely on either Exhibit 1006 or Exhibit 1011. Thus, Patent Owner's Motion to Exclude is dismissed as moot.

MOTION TO SEAL

Patent Owner filed a Motion to Seal on February 23, 2018, requesting that we seal Exhibit 2038 and that we enter a protective order in this proceeding. Paper 30. On March 15, 2018, the parties filed a Joint Motion to Enter a Stipulated Protective Order (Paper 36), which was granted on March 27, 2018 (Paper 37).

We have reviewed the motion to seal and we agree that good cause exists to seal the requested exhibit (Exhibit 2038). Accordingly, we grant the motion to seal.

The record will be maintained undisturbed, with Exhibit 2038 remaining sealed, pending the outcome of any appeal taken from this decision. At the conclusion of any appeal proceeding, or if no appeal is taken, the sealed document will be made public. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,760–61 (Aug. 14, 2012). Further, either party may file a motion to expunge the sealed document from the record pursuant to 37 C.F.R. § 42.56. Any such motion will be decided after the conclusion of any appeal proceeding or the expiration of the time period for appealing, and it will be denied with respect to any sealed document identified in this decision.

CONCLUSION

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 5–10, 12,

14, 16, 17, 20–23, 27, 28, 45, and 55 of the '880 patent are unpatentable

based on the challenges asserted in the Petition. Specifically, Petitioner has

demonstrated by a preponderance of the evidence that claims 1, 5–10, 12,

14, 16, 17, 20–23, 27, 28, 45, and 55 are unpatentable under 35 U.S.C.

§ 103(a) over Thia and Tanenbaum.

MOTION TO AMEND

Patent Owner filed a contingent motion to substitute independent

claim 1 with proposed claim 61, and dependent claims 5–7, 9, 10, 12, 14, 16,

17, 20–23, 27, 28, 45, and 55 with proposed claims 62–78, respectively, if

the original claims are found unpatentable. Paper 20.

In a Motion to Amend, responsive to a ground of unpatentability

involved in a trial, a Patent Owner may propose a reasonable number of

substitute claims that do not expand the scope of the claim or introduce new

matter. 35 U.S.C. § 316(d)(3), 37 C.F.R. § 42.121; *see Aqua Prods., Inc. v.
Matal*, 872 F.3d 1290, 1300–01 (Fed. Cir. 2017). A final substantive

decision on the patentability of originally issued and amended claims must

be based on the entirety of the IPR record, without placing the burden of

persuasion on the Patent Owner. *See Aqua Prods.*, 872 F.3d at 1325–26,

1328.

Proposed substitute claim 61 further limits original claim 1 by adding

a recitation of storing a data portion of a first packet in a re-assembly buffer,

storing a header portion in a header buffer, and re-assembling the data

portion with a data portion of a second packet. Proposed substitute claims

62–78 change the dependencies of original claims 5–7, 9, 10, 12, 14, 16, 17,

20–23, 27, 28, 45, and 55, respectively. Paper 20.

Written Description Support

Patent Owner argues that substitute claims 61–78 find written description support in the Specification and claims as published. Paper 58, Corrected App'x A (citing Ex. 2025 Abstract, Figs. 2, 50, ¶¶ [0013], [0074], [0082]–[0083], [0115]–[0116], [0271], [0546], [0593], [0763], [0838], published claims 33, 42, 44, 50, 59).

Petitioner contends that the Specification fails to provide sufficient written description support for any of substitute claims 61–78. Paper 38, 2–9. However, as Patent Owner points out, the Specification discloses a "context" used "to reassemble IP fragments" [0074], placing a header "into a header buffer" [0115] and claim 42 (of US Patent Publication No. 2004/0062246 A1 (Ex. 2025)) recites an apparatus comprising a re-assembler configured to re-assemble a data portion of a first packet with a data portion of a second packet, as recited in substitute claim 61, for example. Accordingly, we determine that the Specification provides sufficient written description support for the proposed substitute claims.

35 U.S.C. § 112, second paragraph

Proposed substitute claim 61 recites storing data in a "header buffer" that is "separate from" the packet memory. Petitioner argues that one of skill in the art would have understood that the term "separate from" in the context of different memories being "separate from" each other to include the two memories being "located in the same memory device" but that the

location within the same memory device where the data is stored "are different." Petitioner also argues that the term "separate from" also includes that data "could be on a separate memory device from the packet memory, or that the two are separate in a virtual sense, such that the location for storing a header has a different memory address than the location for storing an incoming packet." Paper 38, 9–10 (citing Ex. 1210, 22–28).

Patent Owner's expert (Dr. Almeroth) testifies, "[t]he packet memory stores the entire packet and the header buffer is a separate memory device or a separate location in memory that stores just the header portion of the packet." Ex. 2305 ¶ 19. Hence, Patent Owner explains that one of skill in the art would have understood that a "buffer" that is "separate from" a "memory" is a "buffer" that is either a separate memory device or a different part (i.e., location) of the same memory.

Hence, both Petitioner and Patent Owner argue that one of skill in the art would have understood the term "separate from," as recited in proposed substitute claim 61, as meaning either on a separate memory device or in a different memory location within the same memory device.

Nonetheless, Petitioner disputes Patent Owner's interpretation of "separate from" because, according to Petitioner, Patent Owner fails to "offer an explanation as to why the 'separate from' phrase necessarily excludes other types of information." Paper 50, 8. We agree with Petitioner that one of skill in the art would have understood that "separate from" does not "necessarily exclude" other types of information. However, we agree with Patent Owner's expert that one of skill in the art of ordinary creativity and not being an automaton would have understood that a memory (e.g., a "buffer") that is "separate from" another memory would have included a

different memory device or a different location within the same memory. *See* Ex. 2305 ¶¶ 17–18. Therefore, we are not persuaded by Petitioner that substitute claims 61–78 are indefinite under 35 U.S.C. § 112, second paragraph.

Obviousness

Substitute claim 61 (corresponding to original claim 1) recites storing a first packet received at a network interface for the host computer system in a packet memory. Petitioner argues that the combination of Thia and Tanenbaum discloses this feature. Paper 38, 12–14 (citing Pet. 35–38, Ex. 1015 Fig. 4). For example, Petitioner argues that "[t]his limitation reflects standard TCP protocol operation" and that Thia discloses a "host computer . . . coupled to a Network Interface Adaptor (NIA) and ROPE chip . . . for receiving packets from a network." Pet. 36–37; Ex. 1210, .022–.025; Ex. 1015 Figs. 2–4.

Substitute claim 61 recites storing a data portion of the first packet in a re-assembly buffer. Petitioner argues that the combination of Thia and Tanenbaum discloses this feature. Paper 38, 15–20 (citing Ex. 1006, .431, .540–.541, .545, .590; Ex. 1015 Fig. 2, .005–.007, .010, .014; Ex. 1210 A-28, A-29, A-30–A-33; Ex. 1218, 001; Ex. 2019, 8). For example, as Petitioner explains, Tanenbaum discloses that "the data portions [of packets] . . . are re-assembled in the correct order together into a buffer" (e.g., "reconstructs the original byte streams" and "buffer" data when "a full buffer has been received"). Paper 38, 15–16 (citing Ex. 1006, .540–.541, .545, .590).

Substitute claim 61 recites storing the header portion of the packet in a header buffer separate from packet memory. Paper 38, 20–24 (citing Ex. 1210 A-34–A-36; Ex. 1015 Fig. 4, .001, .005, .011). As Petitioner explains, one of skill in the art would have understood that a "buffer" is "a portion of memory" that stores data and that a "header portion of packet" would have been stored in a "header buffer." Paper 38, 20 (citing Ex. 1210 A-34; Ex. 1015 Fig. 4). Also as Petitioner points out, Thia discloses an "external memory" that is "separate from" (i.e., either via "virtual separation or physical separation") from a portion of memory storing a header (i.e., a "header buffer"). Paper 21–22 (citing Ex. 1210 A-36; Ex. 1015 Fig. 4, .005, .011).

Also, we note that Thia discloses a "test [that] matches the incoming PDU headers with a template that identifies the predicted bypassable headers" (Ex. 1015, .003). Thus, one of skill in the art would have understood that the header portion of the packet may be processed separately from the data portion of the packet. One of skill in the art, being of ordinary creativity and not being an automaton, would have further understood that data that is processed separately may be stored separately at least as a matter of common sense, the separate storing of the separately processed data providing (separate) accessibility of the data to facilitate the (separate) processing of the data.

In particular, Tanenbaum confirms that one of skill in the art would have known that the header and data portions of a packet may be separately processed (and, hence, separately stored). For example, Tanenbaum discloses that a process in which data is processed and, subsequently, a header is (separately) placed "in front of the message." Ex. 1006, .037.

Patent Owner argues that Thia and Tanenbaum fails to disclose or suggest "a header buffer that is *separate from* the packet memory." Paper 43, 7–9. We are not persuaded by Patent Owner's argument for at least the previously discussed reasons.

Claim 61 recites re-assembling the data portion of a first packet with the data portion of a second packet. Petitioner argues that the combination of Thia and Tanenbaum discloses these features. Paper 38, 20–24. We agree with Petitioner. For example, Tanenbaum discloses that one of skill in the art would have understood that transmitted data are subject to "mechanisms for disassembling, transmitting, and then reassembling messages" in which data are "gather[ed] together" to form a "single large message." Ex. 1006, .037, .039. Tanenbaum also discloses a process that "fragments the incoming byte stream into discrete messages" and "[a]t the destination, the receiving TCP process reassembles the received messages into the output stream." Ex. 1006, .055.

Patent Owner argues that Thia "does not perform any reassembly of the PDUs" and Tanenbaum "also does not disclose re-assembling data portions." Paper 43 9–10. As previously discussed, Tanenbaum discloses "fragment[ing] the incoming byte stream into discrete messages and pass[ing] each one onto the internet layer [and at] the destination, the receiving TCP process reassembles the received messages into the output stream. Ex. 1006, .056. Patent Owner does not explain a sufficient difference between reassembling messages, as disclosed by Tanenbaum, and reassembling data portions of packets. In both cases, data from packets are reassembled.

ORDER

ORDERED that claims 1, 5–10, 12, 14, 16, 17, 20–23, 27, 28, 45, and 55 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is DENIED;

FURTHER ORDERED that Petitioner's Motion to Exclude is DENIED;

FURTHER ORDERED that Patent Owner's Motion to Exclude is DISMISSED;

FURTHER ORDERED that Patent Owner's Motion to Seal (Paper 30) is GRANTED; 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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