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 IPR2017-01410
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 IPR2017-01737, and Dell, Inc., which filed a Petition in Case IPR2018-00339, 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 72.

I. INTRODUCTION

Responsive to the filed Petition (Paper 1, "Pet."), we instituted an *inter partes* review of all challenged claims (claims 32, 34, 35, 37–39, and 41–43) of U.S. Patent No. 8,131,880 B2 ("the '880 patent," Ex. 1001). Paper 8. 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 IPR2017-01737 and IPR2018-00339, we joined Cavium, Inc. (now Cavium, LLC) and Dell, Inc., respectively, as petitioners in this proceeding. Paper 8 in IPR2017-01737; Paper 9 in IPR2018-00339. According to updated mandatory notices filed in this proceeding, Cavium, Inc. has now been converted to Cavium, LLC. Paper 72. Petitioners Intel Corporation, Cavium, Inc., 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 54), Patent Owner filed an Opposition (Paper 58), and Petitioner filed a Reply to Patent Owner's Opposition (Paper 60).

Patent Owner filed a Motion to Exclude (Paper 55), Petitioner filed an Opposition (Paper 57), and Patent Owner filed a Reply to Patent Owner's Opposition (Paper 61).

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

A transcript of an oral hearing held on September 13, 2018 (Paper 73) 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 32, reproduced below, is illustrative of the claimed subject matter:

> 32. A method of transferring a packet received at a network interface from a network to a host computer system, comprising:
> receiving a packet from a network at a network interface of a host computer system;
> parsing a header portion of said packet to extract an identifier of a source entity and an identifier of a destination entity;
> generating a flow key from said source identifier and said destination identifier to identify a communication flow comprising said packet, wherein said flow key includes a TCP

connection for the communication flow and a first hop medium
access control (MAC) layer address;

determining whether a header in said header portion
conforms to a pre-selected protocol;

storing said flow key in a database;

associating an operation code with said packet, wherein
said operation code identifies a status of said packet;

storing said packet in a packet memory;

if said header conforms to the TCP protocol:

storing a data portion of said packet in a re-assembly
buffer;

storing said header portion in a header buffer; and

processing, by the network interface, said packet according
to the TCP connection.

Id. at 93:3–29.

GROUNDS OF INSTITUTION

We instituted trial on claims 32, 34, 35, 39, and 41–43 as unpatentable

under 35 U.S.C. § 103 over Thia[2] and Tanenbaum[3] and claims 37 and 38 as

unpatentable under 35 U.S.C. § 103 over Thia, Tanenbaum, and Nahum,[4]

which are all proposed challenges to patentability. Pet. 19.

ANALYSIS

Petitioner argues that the combination of Thia and Tanenbaum

discloses receiving a packet at a network interface of a host computer system

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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).
[4] Erich M. Nahum, et al., Performance Issues in Parallelized Network
Protocols," Proceedings of the First Symposium on Operating Systems
Design and Implementation, November 1994 ("Nahum," Ex. 1079).

and parsing a header portion of the packet to extract an identifier of a source entity and an identifier of a destination entity as recited in claim 32. For example, Petitioner argues that Tanenbaum discloses that one of skill in the art would have understood that "conventional processing of an incoming data packet" includes receiving an "incoming TCP/IP packet [that] comprises both an IP header and a TCP header," that "[t]he IP and TCP headers include source and destination IP addresses and TCP ports," and that "the source and destination addresses and ports are identifiers of source and destination entities." Pet. 44–46 (citing Ex. 1006, .431, .434, .524, .541, .544, Figs. 5-45, 6-23, 6-24).

Petitioner argues that the combination of Thia and Tanenbaum discloses generating a flow key that includes a TCP connection for a communication flow and a first hop medium access control (MAC) layer address, as recited in claim 32. Pet. 47–49. For example, as Petitioner explains, Tanenbaum discloses a "connection record" or flow key that "is generated from 'some simple function of' the data . . . *i.e.*, the two IP address and two port numbers" that "identif[ies] a TCP connection for the communication flow." Pet. 48 (citing Ex. 1006, .541, 585; Ex. 1001, 7:19–22). Petitioner also explains that "it would have been obvious to have a flow key additionally include a next-hop MAC layer address" "in order to verify the flow key against the information relevant to the connection during lookup." Pet. 49 (citing Ex. 1003 ¶¶ 30–31, A-14; Ex. 1006, .585). We also credit Petitioner's expert's uncontested testimony that "[a] next-hop MAC layer address indicates the physical location a packet is first routed on its way to its final destination for the connection and is therefore information relevant to the connection." Pet. 49 (citing Ex. 1003, 30–31, A-14).

Patent Owner argues that Petitioner fails to "identify any disclosure in the prior art of a flow key that includes a first hop MAC," provide "anything more than an unadorned conclusion," provide a "stated rationale in the prior art for adding additional information, let alone a next-hop MAC address specifically," or "explain *why* a flow key that includes a first hop MAC address would have been obvious." PO Resp. 27–29. We are not persuaded by Patent Owner's argument at least because Patent Owner does not assert or demonstrate specific flaws in the rationale provided by Petitioner.

For example, as Petitioner and Petitioner's expert explain, when "Ethernet is used," one of skill in the art would have known that "source and destination MAC (media access control) addresses" "determine[] the next hop along the route to the destination" "such as a network interface card (NIC)." *See, e.g.*, Ex. 1003 ¶¶ 28, 30, 31. Hence, Petitioner's evidence demonstrates that one of skill in the art would have known that transmission of data in a network to a destination, such as to a network interface card, is accomplished by a known "MAC address" that identifies a destination of the data. We agree with Petitioner that it would have been obvious to one of ordinary skill in the art, when attempting to transmit data in a network to a destination, to include a known parameter (i.e., a MAC address) that indicates the destination of the transmitted data. Otherwise, the data would not be transmitted to the desired destination, the desired destination not having been identified by the (known) MAC address.

Claim 32 recites an "operation code." Petitioner argues that the combination of Thia and Tanenbaum discloses this feature. Pet. 52–55. For example, Petitioner argues that Thia discloses "checking the header portion of an incoming packet to see if it matches what is expected or predicted,"

subsequently making a "fast-path determination," then "rout[ing] the packet
. . . for fast-path/bypass processing." Pet. 52–53 (citing Ex. 1015, .003,
.006, .007, .013, .014, Table 1, Fig. 2; Ex. 1006, .585). Petitioner also
explains that it would have been obvious to one of ordinary skill in the art to
"us[e] an operation code . . . instructing whether to process the packet on
the" bypass interface by, in one example, "checking the header portion of an
incoming packet to see if it matches," or, in another example, "a flag . . .
signifying that a packet can be fast-pathed." Pet. 52–55 (citing Ex. 1015,
.004, .009, A-22–A-24).

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," "does not
need to *also* associate the PDU with an operation code," and only discloses a
"PDU header" that supposedly does not include "*a component* . . . to
determine whether it is bypassable." PO Resp. 30, 32, 39–40. 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.

To the extent that Patent Owner argues that an "operation code" is "associated" with a data packet by indicating a status of the packet, as recited in claim 32, 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 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. 38. Even assuming Patent Owner's contention to be correct that Thia fails to disclose using an operation code 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.

Petitioner argues that the combination of Thia and Tanenbaum discloses storing the header portion of the packet in a header buffer if the header conforms to the TCP protocol, as recited in claim 32. Pet. 58–60. For example, Petitioner argues that one of skill in the art would have understood "that a buffer is a portion of memory" and that "a packet . . . includes header and data portions" and would have been "placed into a packet memory." Pet. 58–59 (citing Ex. 1003 A-30; Ex. 1015 Fig. 4).

Patent Owner argues that the combination of Thia and Tanenbaum fails to disclose storing a header portion of a packet in a header buffer because, according to Patent Owner, Thia discloses (in Fig. 4 of Thia) storing a packet header in a "Protocol Header" portion of memory but that the portion of memory (i.e., "Protocol Header") that stores the header

portion of a packet "are not the claimed separate 'header buffer." PO Resp. 41; Ex. 1015 Fig. 4. We are not persuaded by Patent Owner's arguments at least because Patent Owner does not point out sufficient differences between the portion of memory that stores a header portion of a packet of Thia and the "header buffer," as recited in claim 32, for example. In both cases, a header portion of a packet is stored in a specified portion of memory.

Patent Owner also argues that Thia fails to disclose storing the header portion of the packet "if said header conforms to the TCP protocol." PO Resp. 42. However, we are persuaded by Petitioner and Petitioner's expert that one of ordinary skill in the art, having ordinary creativity and not being an automaton, would have understood that, when performing a process of "fast-path" processing for TCP, the header would conform to the TCP protocol. Otherwise, one of skill in the art would have understood that the process would not operate as desired, the header not conforming to the protocol in use in the system.

Petitioner argues that the combination of Thia and Tanenbaum discloses a "flow re-assembler" that re-assembles a data portion of a packet with a data portion of another packet, as recited in claims 41 and 42, for example, that Tanenbaum "suggests that the re-assembler is provided on a network interface," and that Thia "provides an express disclosure." Pet. 77–78 (citing Ex. 1006, .498). In particular, Petitioner argues that Tanenbaum "discloses that the TCP protocol processes packets and re-assembles the data portions" and that "packets conforming to the TCP protocol are processed and the data portions . . . are re-assembled in the correct order together into a buffer." Pet. 57–58, 77.

Patent Owner argues that "Petitioners admit Tanenbaum does not disclose a flow re-assembler," as recited in claim 41, but fails to demonstrate that Petitioner, in fact, "admitted" that Tanenbaum fails to disclose the disputed claim limitation or how the re-assembly of data portions of packets of Tanenbaum (relied upon by Petitioner) differs from the reassembly of data portions of packets, as recited in claim 41. In both cases, data portions of packets are reassembled. PO Resp. 43.

Petitioner argues that the combination of Thia and Tanenbaum discloses a processor that maintains a TCP connection that is stored as a control block on the network interface, as recited in claims 41 and 42. Pet. 78–81. For example, Petitioner argues that "[t]his limitation reflects standard TCP protocol operation . . . on a network interface" in which "a packet is received [and] classified . . . [and] processed" including "updating the TCP connection for the communication flow." Pet. 78. In addition, Petitioner argues that Thia discloses "control blocks to store information" by "sending information . . . to the bypass chip" that are "stored in a process control block." Pet. 79 (citing Ex. 1015, .009).

Patent Owner argues that Thia and Tanenbaum fail to disclose a "processor." PO Resp. 45, 50. In the absence of sufficient evidence to demonstrate persuasively that one of skill in the art, given the level of skill in the art at the time of the invention, would not have understood that a "processor" is used to process data, we agree with the Petitioner that one of skill in the art being of ordinary creativity and not being an automaton would have understood that a "processor" would have been utilized in a system that "processes" packets (as disclosed by the combination of Thia and Tanenbaum).

Patent Owner does not provide additional argument with respect to 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. 30–32. In particular, Petitioner argues that Thia discloses that one of ordinary skill in the art would have known and understood "offloading network protocol processing," "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. 31–32; Ex. 1015, .003; Ex. 1003 ¶ 110; Ex. 1006, .056–.057.

Petitioner also argues that Tanenbaum discloses a similar system for "expedited network protocol processing similar to Thia" including "the concept of Header Prediction" and that "many TCP implementations use it." Pet. 33 (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 cited references because
"Tanenbaum teaches away from performing protocol processing using
anything other than the host CPU." PO Resp. 54 (citing Ex. 1006, .588–
.589). 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, 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 is directed to the cost of the CPU used and not
whether a "host CPU" is used or not. We are not persuaded by Patent
Owner's argument.

Patent Owner argues that it would not have been obvious to one of
ordinary skill in the art to have combined the cited references because
"Tanenbaum explains the lack of interest in OSI." PO Resp. 55. 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 alleged
disclosure regarding an supposed "lack of interest in OSI" sufficiently
refutes Petitioner's prima facie showing of obviousness of the disputed
claims over the combination of Thia and Tanenbaum.

Patent Owner argues that it would not have been obvious to one of ordinary skill in the art to have combined the cited references because Thia discloses that "bypass could be used 'for any standard protocol' . . . [but actually means] any standard *OSI* protocol." PO Resp. 55. 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. 31–36 (citing Ex. 1003)) that one of ordinary skill in the art, when confronted with the phrase "any standard protocol," 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 argues that it would not have been obvious to one of ordinary skill in the art to have combined the cited references because Thia discloses "modify[ing] existing *OSI* stack software" but fails to disclose "a TCP/IP protocol stack." PO Resp. 57. 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 does not explain how Thia's system that is based on "TCP/IP" actually does not use a "TCP/IP protocol stack." In any event, even assuming Patent Owner's contention to be correct that Thia supposedly fails to disclose TCP/IP, Patent Owner does not assert or demonstrate persuasively that the combination of

14

Thia and Tanenbaum also fails to disclose TCP/IP. As previously discussed, the combination of Thia and Tanenbaum discloses this feature.

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. 58–59. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 20–21. 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 some unspecified limitation recited in claim 32 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. 60. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 21–22. 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 22 (citing Exs. 1224, 1227, 1228, 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. 60. We are not persuaded by Patent Owner's arguments for at least the reasons set forth by Petitioner. Pet. Reply 22–23. 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 22–23. 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 23 (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 32, 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. 61–62. We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 23. 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. 61–62 (citing Ex. 2039 ¶ 4; Ex. 2026 ¶ 189; Ex. 2026 ¶ 190)), 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. 62 (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 24. 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 2–3. 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. 63. We are not persuaded by

Patent Owner's argument for at least the reasons set forth by Petitioner. Pet. Reply 24. 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 both Intel's and Cavium's customer and indemnitee," that "Dell, Cavium, and Intel have closely intertwined financial interests and business relationships; express indemnification agreements; 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. 65–66.

We note that Dell and Cavium are both 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 54 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 58. 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 55, 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 32, 34, 35, 37–39, and 41–43 are unpatentable based on the challenges asserted in the Petition. Specifically, Petitioner has demonstrated by a preponderance of the evidence that claims 32, 34, 35, 39, and 41–43 are unpatentable under 35 U.S.C. § 103 over Thia and Tanenbaum and claims 37 and 38 are unpatentable under 35 U.S.C. § 103 over Thia, Tanenbaum, and Nahum.

MOTION TO AMEND

Patent Owner filed a contingent motion to substitute new independent claims 79, 85, and 87 for original claims 32, 41, and 43, respectively, and new dependent claims 80–84 and 86 for original claims 34, 35, 37–39 and 42, 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, 1300–1 (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 79 further limits original claim 32 by adding a recitation of the header buffer being separate from the packet memory and re-assembling the data portion of a packet with a data portion of a second packet. Proposed substitute claim 85 further limits original claim 41 by adding a recitation of a parser configured to extract information from a header portion of a packet and a header buffer separate from a packet memory and configured to store the information from the header portion of a packet. Proposed substitute claim 87 further limits original claim 43 by adding a recitation of a header buffer separate from a memory and configured to store information from a header portion of a packet. Proposed substitute claims 80–84 and 86 change the dependencies of original claims 34, 35, 37–39, and 42, respectively. Paper 20.

Written Description Support

Patent Owner argues that substitute claims 79–87 find written description support in the Specification. Paper 20, App'x A (citing Ex. 2025 Abstract, Figs. 1, 2, ¶¶ [0013], [0074], [0080], [0082]–[0083], [0085], [0115]–[0116], [0271], [0589]–[0593]; published claims 33, 42, 43, 44, 58, 59).

Petitioner contends that the Specification fails to provide sufficient written description support for any of substitute claims 79–87. Paper 38, 2–8. However, as Patent Owner points out, the Specification discloses a

"context" used "to reassemble IP fragments" (Ex. 2025 ¶ [0074]), placing a header "into a header buffer" (Ex. 2025 ¶ [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 79, 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 79 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. Therefore, we are not persuaded by Petitioner that substitute claims 79–87 are indefinite under 35 U.S.C. § 112, second paragraph.

Obviousness

As noted, substitute claim 79 recites a header buffer separate from packet memory. Substitute claims 85 and 87 recite a similar feature. As Petitioner explains, 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 38, 16–17 (citing Ex. 1210 A-37; 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.

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. We are not persuaded by Patent Owner's argument for at least the previously discussed reasons.

Substitute claim 79 recites re-assembling the data portion of a first packet with the data portion of a second packet. Substitute claim 85 recites a similar feature. Petitioner argues that the combination of Thia and Tanenbaum discloses these features. Paper 38, 17–18. 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 that a process that "fragments the incoming byte stream into discrete messages" and "at the destination, the receiving TCP process reassembles the received messages into the output stream." Ex. 1006, .005.

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, 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, 37. 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.

Additional proposed claim amendments are features previously recited in other claims and previously addressed in the record. Patent Owner also does not provide additional arguments in support of these amendments.

ORDER

ORDERED that claims 32, 34, 35, 37–39, and 41–43 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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