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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORP., CAVIUM, LLC, DELL INC., and
WISTRON COPORATION,
Petitioner,

v.

ALACRITECH, INC.,
Patent Owner.

Case IPR2017-01391[1]
Patent 7,237,036 B2

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

BOUDREAU, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

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[1] Cavium, Inc., which filed a petition in Case IPR2017-01718, was joined as a petitioner in this proceeding. Cavium, Inc. has now been converted to Cavium, LLC. Paper 76. Wistron Corporation, which filed a petition in Case IPR2018-00327, and Dell Inc., which filed a petition in Case IPR2018-00371, also have been joined as petitioners in this proceeding.

I. INTRODUCTION

Intel Corporation ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting *inter partes* review of claims 1–7 ("the challenged claims") of U.S. Patent No. 7,237,036 B2 ("the '036 patent," Ex. 1001) under 35 U.S.C. §§ 311–319. Alacritech, Inc. ("Patent Owner") filed a Preliminary Response. Paper 7 ("Prelim. Resp."). Upon consideration of the Petition and Preliminary Response, we instituted an *inter partes* review of all challenged claims. Paper 8 ("Decision on Institution" or "Dec."). Responsive to petitions and requests for joinder filed in IPR2017-01718, IPR2018-00327, and IPR2018-00371, we later joined Cavium, Inc. (now Cavium, LLC), Wistron Corp., and Dell, Inc., respectively, as petitioners in this proceeding. *See* Papers 11, 39, 47, 76. Intel Corporation, Cavium, LLC, Wistron Corp., and Dell, Inc. are identified herein collectively as "Petitioner."

Following institution, Patent Owner filed a Corrected Patent Owner's Response (Paper 30, "Response" or "PO Resp."), and Petitioner filed a Reply (Paper 41, "Pet. Reply"). Patent Owner also filed a Contingent Motion to Amend (Paper 21, "Mot. Amend."), to which Petitioner filed a Response (Paper 36, "Resp. Mot. Amend."). Patent Owner filed a Reply to Petitioner's Response (Paper 42, "Reply Mot. Amend."), and Petitioner filed a Sur-reply (Paper 50, "Sur-reply Mot. Amend.").

Petitioner filed a Motion to Exclude (Paper 55), to which Patent Owner filed an Opposition (Paper 61), and Petitioner filed a Reply to Patent Owner's Opposition (Paper 63).

Patent Owner also filed a Motion to Exclude (Paper 56), to which Petitioner filed an Opposition (Paper 60), and Patent Owner filed a Reply to Patent Owner's Opposition (Paper 65).

Patent Owner filed a Motion to Seal (Paper 28).

Oral argument for this proceeding was held on September 13, 2018, and a transcript has been entered into the record as Paper 77 ("Tr.").

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, for the reasons that follow, that Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable. We also deny in part and dismiss in part Patent Owner's Motion to Exclude, deny Petitioner's Motion to Exclude, deny Patent Owner's Contingent Motion to Amend; and grant Patent Owner's Motion to Seal.

II. BACKGROUND

A. Related Matters

The parties indicate that the '036 patent is asserted in *Alacritech, Inc. v. CenturyLink, Inc.*, 2:16-cv-00693-JRG-RSP (E.D. Tex.); *Alacritech, Inc. v. Wistron Corp.*, 2:16-cv-00692-JRG-RSP (E.D. Tex.); and *Alacritech, Inc. v. Dell Inc.*, 2:16-cv-00695-RWS-RSP (E.D. Tex.). Paper 73, 2; Paper 74, 3–4.

B. The '036 Patent

The '036 patent, titled "Fast-path Apparatus for Receiving Data Corresponding a TCP Connection," describes "a device for processing network communication that greatly increases the speed of that processing and the efficiency of transferring data being communicated." Ex. 1001, [54], 5:15–18. The processing "includes employing representative control instructions for a given message that allow data from the message to be processed via a fast-path" that "bypasses conventional protocol processing of headers that accompany the data." *Id.* at 5:30–36.

C. Illustrative Claim

Claim 1, reproduced below, is the sole independent claim challenged and is illustrative of the claimed subject matter:

> 1. A device for use with a first apparatus that is connectable to a second apparatus, the first apparatus containing a memory and a first processor operating a stack of protocol processing layers that create a context for communication, the context including a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information, the device comprising:
>
> a communication processing mechanism connected to the first processor, said communication processing mechanism containing a second processor running instructions to process a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory and the TCP state information is updated by said second processor.

Ex. 1001, 98:63–99:10.

D. Instituted Ground of Unpatentability

We instituted *inter partes* review of claims 1–7 as unpatentable under 35 U.S.C. § 103 over Erickson[2] and Tanenbaum,[3] which was the only proposed challenge stated in the Petition. Pet. 14–15; Dec. 19.

III. DISCUSSION

A. Claim Construction

In an *inter partes* review instituted on a petition filed prior to November 13, 2018, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In our Decision on Institution, we determined that it was unnecessary to provide an express construction of any claim term for purposes of institution of *inter partes* review. Dec. 8. The parties do not challenge that determination in their post-institution briefing, and we are not persuaded that any express construction is required for purposes of this Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)

[2] U.S. Patent No. 5,768,618, issued June 16, 1998 ("Erickson," Ex. 1005).
[3] Andrew S. Tanenbaum, *Computer Networks* (3d ed. 1996) ("Tanenbaum," Ex. 1006).

(explaining that only those terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy).

B. Analysis of the Asserted Ground of Unpatentability

1. General Principles

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). 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) when presented, objective evidence of nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. Level of Skill in the Art

Petitioner contends that a person having ordinary skill in the art ("POSA" or "POSITA") with respect to the technology described in the '036 patent as of the October 14, 1997, filing date of the earliest provisional application from which the '036 patent claims priority would be "a person with at least the equivalent of a B.S. degree in computer science, computer engineering or electrical engineering with at least five years of industry experience including experience in computer architecture, network design, network protocols, software development, and hardware development." Pet. 33–34. Patent Owner proposes a slightly different assessment (i.e., "a person with a Bachelor's degree in Computer Science, Computer

Engineering, or the equivalent, and several years' experience in the fields of computer networking and/or networking protocols"), but argues that "[a]ny differences between this and Petitioners' proposed level of ordinary skill would have no bearing on the analysis presented." PO Resp. 22. To the extent necessary for purposes of this Decision, we have adopted Patent Owner's assessment.

3. Scope and Content of the Prior Art

a. Overview of Erickson

Erickson is directed to a "method of controlling an input/output (I/O) device connected to a computer to facilitate fast I/O data transfers." Ex. 1005, Abstract. Figure 3 of Erickson is reproduced below:

FIG. 3

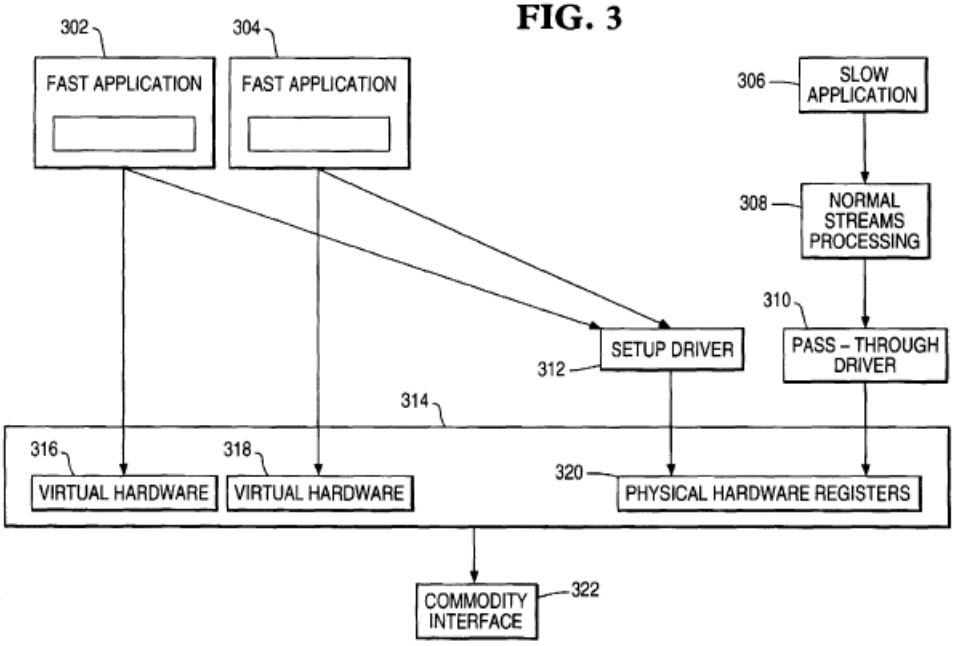

Figure 3 depicts data flow in accordance with Erickson's invention. As shown in Figure 3, slow application 306 uses normal stream processing 308 and pass-through driver 310 to send information to I/O device adapter 314

and then to commodity interface 322. *Id.* at 4:53–61. Alternatively, fast applications 302 and 304 send information directly to I/O adapter 314 via setup driver 312 or "virtual hardware" 316 and 318, avoiding the overhead of the streams processing and pass-through driver. *Id.* at 4:61–5:3.

b. Overview of Tanenbaum

Tanenbaum is a book that describes general principles, as well as detailed aspects, of data transmission in computer networks, including TCP/IP and UDP/IP protocols. *See generally* Ex. 1006.

4. Discussion – Differences Between the Claimed Subject Matter and the Prior Art

Having reviewed the Petition, Response, and Reply, as well as the presented evidence, we determine, for the reasons that follow, that Petitioner has established by a preponderance of the evidence that the challenged claims are unpatentable on the asserted ground.

a. Claim 1

Petitioner contends claims 1–7 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Erickson and Tanenbaum. Pet. 50–88. As set forth in more detail below, Petitioner relies on Erickson as teaching or suggesting all limitations recited in claim 1, with the exception of (1) the context for communication including TCP state information and (2) TCP state information being updated by a second processor, as recited in the final step of claim 1, which limitations Petitioner contends are disclosed by Erickson in view of Tanenbaum. *Id.* at 50–69. Petitioner relies on the testimony of Dr. Robert Horst to support its contentions regarding how the cited references describe the claim limitations. *Id.* (citing Ex. 1003).

In its Response, Patent Owner raises five principal arguments with respect to Petitioner's contentions: first, that there is no motivation to combine Erickson and Tanenbaum; second, that the asserted prior art fails to disclose a "communication processing mechanism containing a second processor"; third, that the asserted prior art fails to disclose the "second processor . . . running instructions to process a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory"; fourth, that the asserted prior art fails to disclose "the TCP state information is updated by said second processor"; and fifth, that "strong evidence of secondary considerations weighs against obviousness." PO Resp. 23–56 (emphases omitted). Patent Owner relies on the testimony of Dr. Kevin Almeroth in support of its arguments. *Id.* (citing Ex. 2026).

We address the parties' contentions with respect to each limitation of claim 1 in turn below.

> *"A device for use with a first apparatus that is connectable to a second apparatus, the first apparatus containing a memory and a first processor . . ."*

Petitioner contends Erickson's I/O device adapter 314 is "a device" that is for use with a "computer" or "sender" (first apparatus) and connectable to a "receiver" (second apparatus) over a network. *See* Pet. 50–52 (citing Ex. 1005, 1:63–67, 3:23–36, Fig. 1, Fig. 3). Petitioner contends the computer contains a "memory and a first processor" as recited. *See id.* at 52–53 (citing Ex. 1005, 1:63–67, 2:54–61, 9:48, Fig. 5). Petitioner provides evidence that a person of ordinary skill in the art would have understood the computer to have a processor to execute applications. *See* Ex. 1003, Appendix A § 1.P.2.

Patent Owner does not raise any counterarguments or point to any contrary evidence with respect to this limitation, and we are persuaded by Petitioner's arguments and cited evidence that the limitation is taught by Erickson.

> *". . . [the first processor] operating a stack of protocol processing layers that create a context for communication, the context including a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information . . ."*

We are persuaded, for the reasons stated below, that this limitation is taught by Erickson in view of Tanenbaum. In particular, Petitioner contends that Erickson's disclosure of "Normal Streams Processing 308" performs conventional protocol processing (i.e., a "stack of protocol layers") for slow applications on the host. Pet. 54 (citing Ex. 1005, Fig. 3, 4:52–61); *see also* Ex. 1003, Appendix A § 1.P.3. We agree. As Petitioner persuasively contends, Erickson discloses a user process on the computer that creates the claimed context for communication by opening a device driver and specifying a protocol type (e.g., User Datagram Protocol ("UDP") or Transmission Control Protocol ("TCP")), source port or address, and "'almost everything' concerning a UDP datagram 'except the actual user data.'" Pet. 56–57 (citing Ex. 1005, 6:1–9, 6:57–7:4, Fig. 6, Fig. 7). This information includes Ethernet Header 604 and IP Header 606. Ex. 1005, 6:64–66.

Petitioner contends that, although Erickson's *exemplary* context is UDP, it also discloses the use of TCP/IP and refers readers to the 1981 edition of Tanenbaum. Pet. 58 (citing Ex. 1005, 4:38–43). Petitioner contends that, according to the 1996 version of Tanenbaum (i.e., Ex. 1006), once various "control packets" are exchanged with a destination computer,

the TCP connection "enters an ESTABLISHED state," where applications can exchange data through the connection. Pet. 20. Petitioner contends that TCP connections in the "ESTABLISHED" state can be "fast path" processed on Erickson's I/O device adapter after "the sequence of special packets needed to get into the ESTABLISHED state are handled on the conventional (slow) path." *Id.* at 58–59 (citing Ex. 1006, 565).[4] Figure 6-50 of Tanenbaum is reproduced below:

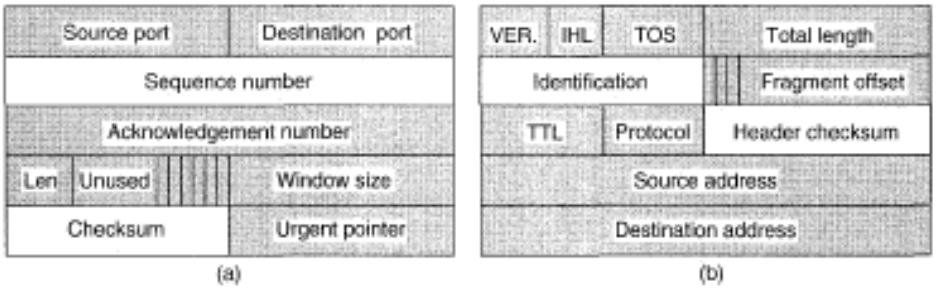

Fig. 6-50. (a) TCP header. (b) IP header. In both cases, the shaded fields are taken from the prototype without change.

Figure 6-50 of Tanenbaum depicts a TCP and IP header with shaded areas indicating no changes during one-way data transmission

Ex. 1006, 566. Petitioner contends that a person of ordinary skill in the art would understand that TCP state information, as shown in Figure 6-50, is maintained in Erickson's host until fast path processing begins, at which time only the few, unshaded header fields are changed to created headers for the next packet in the series. Pet. 59–60; Ex. 1003, Appendix A § 1.P.3.

Petitioner provides persuasive evidence that a person of ordinary skill in the art would have been motivated to implement "fast path" TCP/IP on Erickson's I/O device adapter in view of Tanenbaum with a high expectation

[4] We refer to the original page numbering in Tanenbaum, not the page numbers added by Petitioner.

of success. *Id.* at 46–49 (citing Ex. 1003 ¶¶ 138–149), 58–63. Among other things, Petitioner relies on Erickson's suggestion to implement TCP/IP-based scripts on the I/O device adapter and TCP's popularity among a finite number networking protocols. *Id.* at 46 (citing Ex. 1005, 5:41–51; Ex. 1003 ¶ 140).

In the combination, Petitioner contends that a TCP connection could be established on the host computer (i.e., the first apparatus) by opening a socket and specifying an IP address and TCP port. Pet. 20 (citing Ex. 1003 ¶¶ 33–35). Thus, according to Petitioner, a person of ordinary skill in the art would have understood that the protocol processing layers on the computer would have included the ability to form TCP connections and create "TCP state information," as claim 1's "context" requires. *Id.* at 59–60 (citing Ex. 1003 ¶¶ 33–35, 64 n.4, 141–144, 146–147, Appendix A § 1.P.3; Ex. 1006, 566).

While acknowledging Petitioner's arguments regarding similarities between UDP and TCP, as well as Tanenbaum's disclosure of a fast-path procedure for TCP, Erickson's reference to the 1981 version of Tanenbaum, and the growing popularity of TCP/IP in the mid-1990s, Patent Owner contends that a person of ordinary skill in the art "would never have combined these references for a plurality of reasons, none of which are addressed in the Petition." PO Resp. 23.

First, according to Patent Owner, Tanenbaum "expressly teaches away from the use of a separate device, such as *Erickson*'s I/O adapter, for TCP/IP protocol processing." *Id.* at 23–24. Indeed, Patent Owner contends, Tanenbaum "goes so far as to characterize the notion that processing should be offloaded as a '***myth***'" and "goes even further, ***expressly teaching*** that

faster processing can be achieved by making the protocol simply, and ***having the main CPU do the work***":

> Furthermore, when two general-purpose CPUs communicate, ***race conditions can occur***, so elaborate protocols are needed between the two processors to synchronize them correctly[.] Usually, ***the best approach is to make the protocols simple and have the main CPU do the work.***

PO Resp. 24–25 (quoting Ex. 1006, 570–71). Patent Owner contends, "*Tanenbaum* cites to the 'race' conditions created by offloading 'elaborate protocols,' but offers no solution to this problem, a fact Petitioner's own expert agrees with." *Id.* at 25 (citing Ex. 2029, 24:24–25:8, 25:12–14, 26:18–19). "Nor would one of ordinary skill in the art understand ***how*** to offload based on *Tanenbaum*'s disclosure," according to Patent Owner, and "[t]o the contrary, *Tanenbaum* explicitly discloses that ***TCP*** transport entities are implemented in 'a user process or part of the kernel that manages TCP streams and interfaces to the IP Layer'—both of which are ***host*** processes, *i.e.*, both occur on the ***host*** cpu, not a network interface." *Id.* at 26 (citing Ex. 2026 ¶ 92; Ex. 1006, 522). Moreover, Patent Owner contends, "[o]ther than expressly teaching that TCP/IP should not be offloaded, *Tanenbaum* provides no guidance of what protocols 'exceedingly simply' . . . ***could*** be offloaded, much less ***how*** they could be offloaded," and "Petitioner provides ***no*** explanation as to how, or indeed, why a POSITA would have modified *Tanenbaum* in such a way." *Id.* (citing Ex. 2026 ¶ 92).

Second, according to Patent Owner, a person of ordinary skill in the art "would never have combined *Tanenbaum* with *Erickson* because the references are completely different, and technically incompatible," insofar as

"*Erickson* is directed to a UDP implementation, in contrast to *Tanenbaum*'s TCP/IP implementation." *Id.* at 27. Patent Owner contends the "differences between UDP and TCP would require a POSITA 'to fundamentally redesign *Erickson* to include functionality not discussed in either reference.'" *Id.* (quoting Ex. 2026 ¶ 93). Further, Patent Owner contends, a POSITA would not even know how to modify Erickson's I/O device adapter to support TCP. *Id.* at 28–29 (citing Ex. 2026 ¶¶ 94–95).

Third, Patent Owner contends, Tanenbaum does not include an express motivation to combine the cited references. *Id.* at 30. Specifically, Patent Owner asserts, Erickson cites the 1981 edition of Tanenbaum for a reason unrelated to protocol offload, and "a POSITA would not have incentive to pick specific, unrelated parts of *Tanenbaum* and combine it with *Erickson*, particularly in view of *Tanenbaum*'s teaching away from offloading for TCP/IP." *Id.* at 30–31 (citing Ex. 2026 ¶ 96).

Patent Owner further contends that a POSITA would not have had a reasonable expectation of success in combining Tanenbaum with Erickson (*id.* at 31–32); that Petitioner "mischaracterizes the purported similarities" between Erickson and Tanenbaum (*id.* at 32–33); that the complexities of the technology weigh against combining Erickson and Tanenbaum (*id.* at 33–36); that marketplace demands discousraged offloading TCP/IP protocol processing (*id.* at 36–39); and that combining Erickson with Tanenbaum would have the increased complexity of Erickson's I/O adapter, including by increasing I/O bus access and requiring additional logic (*id.* at 39–43).

In its Reply, Petitioner responds that Erickson explicitly states that the disclosed network interface device supports TCP/IP and identifies Tanenbaum as a source of information about TCP/IP. Pet. Reply 1–2.

According to Petitioner, TCP and UDP were the only two transport protocols available for the IP protocol; were known alternatives; both were cited by Erickson; and Tanenbaum discussed both protocols at length. *Id.* at 1–3 (citing Ex. 1005, 8:4–6 ("There are different scripts for different types of datagrams 702 (e.g., UDP or TCP)."); Ex. 1006, 521; Ex. 1003 ¶ 110; Ex. 1223 ¶¶ 24–25, 30). Petitioner contends a person of ordinary skill in the art would have "been motivated to consult Tanenbaum to implement Erickson's TCP functionality and had a more than reasonable expectation of success in implementing the combination because, as Tanenbaum points out, TCP/IP source code implementations were freely available and documented in detail," and applying Tanenbaum's TCP teachings to Erickson was well within the skill of a POSA. *Id.* at 1, 10 (citing Ex. 1003 ¶¶ 138–149). Petitioner contends that Patent Owner's arguments that differences between UDP and TCP would require a "fundamental[] redesign" contradict Erickson's express disclosure that it supports TCP by means of a TCP script. *Id.* at 3. Petitioner argues that Tanenbaum does not teach away from the invention and that Patent Owner's argument is based on the false premise that Tanenbaum is the base reference for the combination, whereas Petitioner's combination is the use of Tanenbaum's TCP fast-path processing to implement TCP processing for Erickson's adapter. *Id.* at 6–7 (citing PO Resp. 26; Pet. 46–49).

Addressing the portion of Tanenbaum cited by Patent Owner as teaching away, Petitioner contends, "[a]t most, Tanenbaum[] suggests that offloading using two different processors may not work well if the second processor is cheaper and slower than the main CPU unless the protocol is very simple," but "does not suggest that a 'plug-in board with a second CPU

and its own program' will not work well if the second CPU is fast enough, regardless of the complexity of the offloaded protocol." *Id.* (citing Ex. 1006, 570–71). Further, Petitioner asserts, Tanenbaum "states that while in 'the ESTABLISHED state' TCP processing is 'straightforward,' not complex." *Id.* at 8 (quoting Ex. 1006, 565–66).

After full consideration of the parties' respective arguments and evidence, we are persuaded, for the reasons stated by Petitioner and discussed above, that Petitioner has established by a preponderance of the evidence that Erickson in view of Tanenbaum discloses "[the first processor] operating a stack of protocol processing layers that create a context for communication, the context including a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information . . . ," as recited in claim 1. *See* Pet. 54–63 (and evidence cited therein). We are also persuaded, for the reasons stated by Petitioner and discussed above, that Petitioner has sufficiently established that a person of ordinary skill in the art would have been motivated to combine the teachings of Erickson and Tanenbaum and would have had a reasonable expectation of success in adapting Erickson to utilize TCP. *Id.* at 46–49, 60–63.

Patent Owner's arguments to the contrary are not persuasive to rebut Petitioner's showing. First, we do not find that Tanenbaum teaches away from combination with Erickson. *Cf.* PO Resp. 23–25. A reference can be said to teach away "when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d

731, 738 (Fed. Cir. 2013). However, "[a] reference that 'merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into' the claimed invention does not teach away." *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017) (quoting *Galderma*, 737 F.3d at 738). The latter is the case here. Although Tanenbaum states, for example, that "elaborate protocols" may be needed "between . . . processors to synchronize them correctly" and that "[u]sually, the best approach is to make the protocols simple and have the main CPU do the work" (Ex. 1006, 571), we find that those statements merely express a preference and would not discourage what Erickson already teaches, namely, fast-path processing. We understand Petitioner to rely on Tanenbaum for greater detail regarding TCP, given that Erickson explicitly cites an earlier version of Tanenbaum for that specific purpose. *See, e.g.*, Pet. 46–48, 58–62; Pet. Reply 1–5, 9–12.

Moreover, the portion of Tanenbaum cited by Patent Owner (PO Resp. 19–20, 23–24) 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, 570–71. Hence, contrary to Patent Owner's contentions that Tanenbaum teaches away from the use of a separate device, such as Erickson's I/O adapter, for TCP/IP protocol processing and discloses "myriad difficulties" with "implementing TCP" (*see, e.g.*, PO Resp. 19–20), 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 we find does not pertain to "implementing TCP." Indeed, rather than teaching away, we understand the

cited passages of Tanenbaum instead to suggest the use of a commensurately fast chip as a network coprocessor for purposes of offload.

Still further, Patent Owner's arguments essentially imply that it would not have been obvious to one of ordinary skill in the art to have bodily incorporated the teachings of Erickson into Tanenbaum (or vice versa). *See, e.g.*, PO Resp. 26. 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 the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

> *". . . the device comprising: a communication processing mechanism containing a second processor . . ."*

Petitioner persuasively contends Erickson's I/O device adapter (i.e., the device) includes a communication processing mechanism connected to the first processor. Pet. 63. Specifically, Petitioner contends I/O device adapter 314 is a communication processing mechanism and is connected to the first processor on the computer over standard I/O buses. *Id.* at 63–64 (citing Ex. 1005, 4:18–23, 4:58–5:10, 3:36–40, Fig. 3).

Petitioner contends the I/O device adapter contains "a second processor," as claim 1 requires, "because it discloses that the I/O device adapter executes "'scripts' (program code)." Pet. 65–66. Specifically, Petitioner cites Erickson's description of "[a] script is prepared by the operating system for the I/O device adapter to execute each time the specific user process programs its specific virtual hardware" as evidence that a person of ordinary skill in the art would have understood Erickson to disclose a second processor on the I/O device adapter. *Id.* at 65 (citing

Ex. 1005, 4:18–23; Ex. 1003, Appendix A § 1.2). Accordingly, Petitioner contends, "Erickson discloses, and at least renders obvious, *said communication processing mechanism* (processor and scripts of I/O device adapter) *containing a second processor* (the processor of the I/O device adapter to execute the scripts)." *Id.* at 66.

In response to Petitioner's arguments, Patent Owner contends that the prior art lacks any teaching of the claimed "second processor." PO Resp. 43. Patent Owner further contends, "*Erickson* describes the script as something 'that ***triggers*** the I/O device adapter,'" and "[o]bviously, a script that triggers the I/O device adapter is not running or executing on a processor within the adapter." *Id.* at 44 (citing Ex. 1005, 7:48–49; Ex. 2026 ¶ 107). According to Patent Owner, "the more logical reading of *Erickson* is that the script runs on the host's processor but part of its actions are carried out on the I/O adapter." *Id.* (citing Ex. 2026 ¶ 107).

Petitioner replies that the single specific statement in Erickson that a particular script "*triggers* the I/O device adapter," cited by Patent Owner, "appears to be a typographical error (*i.e.*, inadvertently repeated from earlier in [Erickson's] specification)," because Erickson shows elsewhere that the same script is executed *on* the adapter. Pet. Reply 15–16 (citing Ex. 1005, 7:19–20, 7:48–79, 8:16, 8:27–30; Ex. 1003 ¶¶ 128, 134; Ex. 1223 ¶¶ 45, 46; Ex. 2028, 71:16–72:7).

We again find Petitioner's arguments and evidence persuasive and are not persuaded to the contrary by Patent Owner's arguments and evidence. Petitioner acknowledges that Erickson does not expressly disclose that I/O device adapter 314 includes a processor, but persuasively argues, with support from Dr. Horst's testimony, that Erickson's disclosure of scripts

executed by I/O device adapter 314 would at least have rendered obvious inclusion of a processor ("second processor," in the parlance of claim 1) in that adapter. Pet. 65–66 (citing Ex. 1003, Appendix A § 1.2); Pet. Reply 15–16 (citing Ex. 1223 ¶¶ 45, 46). Although the portion of Erickson Patent Owner cites refers to "programming that triggers the I/O device adapter" (Ex. 1005, 7:48–49 (cited at PO Resp. 44)), we agree with Petitioner, for the reasons stated in the Reply, that that appears to be a typographical error (*see* Pet. Reply 15–16). Even if it were not an error, that disclosure does not in any way negate Erickson's additional disclosure, for example, of a "script . . . for the I/O device adapter to execute" (Ex. 1005, 4:18–19 (cited at Pet. 65)). Further, as we previously explained in the Decision on Institution, Erickson also provides other examples that suggest the I/O device adapter executes the script and, therefore, has a processor. *See*, *e.g.*, Ex. 1005, 7:41–44 ("The user process provides the starting address and the length . . . and then 'spanks' a GO register *to trigger the I/O device adapter's execution of a predetermined script.*" (emphasis added)), 8:54–57 ("The bus controller then transfers the data to the I/O device adapter and initiates the registers of the I/O device adapter to execute a predetermined script to process the data.").

> *". . . [the second processor] running instructions to process a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory . . ."*

Petitioner contends the combination of Erickson and Tanenbaum teaches the "[second processor] running instructions to process a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory," as claim 1 recites. Pet. 66. Specifically, Petitioner contends Erickson's scripts are instructions for the

second processor, on Erickson's I/O device adapter, to execute and, further, that the scripts "transfer incoming data 'from the memory 512 of the I/O device adapter to the portions of main memory 502 associated with a process.'" *Id.* at 66–68 (citing, e.g., Ex. 1005, 4:53–5:14, 5:53–67, Fig. 4, Fig. 3). Petitioner contends the scripts use "protocol data 518" (i.e., the context) to make this memory transfer. *Id.* As discussed above, Petitioner and its Declarant contend that a person of ordinary skill in the art would have been motivated to modify the exemplary UDP scripts disclosed in Erickson, to use the fast path TCP processing for connections in the "ESTABISHED" state. *See* Ex. 1003 ¶¶ 138–149.

Patent Owner responds that "[b]ecause *Erickson* is focused on UDP implementations, *Erickson* does not disclose any context that includes 'a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information,'" and "*Erickson* is silent regarding employing a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information to transfer data to the first apparatus memory." PO Resp. 45 (citing Ex. 2026 ¶ 109). Patent Owner further contends Tanenbaum fails to cure these alleged deficiencies, because "*Tanenbaum* is also silent regarding a second processor that processes 'a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory,'" and, Patent Owner alleges, "*Tanenbaum*'s fast path is carried out entirely by the host." *Id.* at 45–46.

In its Reply, Petitioner argues that neither Patent Owner nor Dr. Almeroth addresses the actual combination that Petitioner relies upon but instead attack Erickson and Tanenbaum individually. Pet. Reply 17.

Citing Dr. Horst's testimony, Petitioner contends "a POSA following Erickson's suggestion to implement TCP would use Tanenbaum[]'s explanation of the TCP fast path to implement Erickson's fast direct application interface for TCP." *Id.* (citing Ex. 1003 ¶¶ 143–149). Specifically, according to Petitioner, "Erickson discloses a context that includes 'almost everything' concerning a UDP datagram except the actual user data, including a MAC layer address, IP address and UDP address," "Tanenbaum[] states the fast path updates the TCP connection record and copies the data to the user," and "the second processor would look up the connection record (context), and based on the connection record, would copy the data to the user (transfer the data contained in the packet to the host memory)." *Id.* (citing Ex. 1003, Appendix A §§ 1.P.3, 1.3).

We agree with Petitioner that Erickson discloses a two-processor solution for performing UDP processing on the I/O device adapter and teaches that TCP scripts could also be written to do the same. *See* Ex. 1005, 5:36–51. We credit Dr. Horst's testimony that a person of ordinary skill in the art would have been motivated to implement Tanenbaum's explicit teachings of fast-path TCP processing using the two-processor solution of Erickson. *See* Ex. 1003 ¶¶ 138–149. As we explain above, although Tanenbaum suggests that using a two-processor solution may introduce some complexities, Erickson provides motivation to move some protocol processing onto the I/O device adapter. *See* Ex. 1005, 1:62–2:11. Patent Owner does not cite any persuasive evidence in Tanenbaum to suggest that Erickson's objectives would be undermined by using the fast-path TCP processing disclosed in Tanenbaum or that would render Erickson inoperative for its intended purpose. *See Meiresonne*, 849 F.3d at 1383–84

(finding nothing to indicate the modification would detract from the goal of the primary reference).

"... and the TCP state information is updated by the second processor."

Petitioner contends that the combination of Erickson and Tanenbaum teaches updating the TCP state information by the second processor. Pet. 68–69. We again agree. Specifically, Petitioner cites Tanenbaum's disclosure of fast path TCP processing (i.e., on the second processor), where "[t]he fast path updates the connection record and copies the data to the user," the connection records being used to maintain the TCP state. *Id.* (citing Ex. 1006, 566–567, 531; Ex. 1003 ¶¶ 39–41). Petitioner persuasively contends updating the TCP sequence number is example of updated TCP state information. *Id.* at 69 (citing Ex. 1003, Appendix A § 1.4).

In its Response, Patent Owner argues that, whereas the claimed updating of the TCP state information must be performed by the claimed "second processor," the Petition points to Tanenbaum for its teaching of the fast path updating the connection record and copying the data to the user, and, Patent Owner again contends, "however, *Tanenbaum*'s fast path is carried out ***entirely by the host CPU*** . . . and not by any 'second processor' as required by the challenged claims." PO Resp. 46–47 (citing Pet. 69). Patent Owner further contends Erickson fails to cure the alleged deficiency because Erickson does not show or suggest a second processor updating TCP context information that was created or maintained by a first processor. *Id.* at 47. According to Patent Owner, "the claimed updating is performed . . . on the ***receiving side*** of the system," whereas "Dr. Horst acknowledged at his deposition that *Erickson*'s updates to the template header using the UDP script are part of the ***transmit process*** . . . ." *Id.* at 47–

48 (citing Ex. 2028, 72:8–74:16). Accordingly, Patent Owner contends, the combination of Erickson and Tanenbaum would at best "disclose a system that updates a header template on transmit side by the network interface device and updated a connection record on the receive side by the host CPU." *Id.* at 48.

In reply, Petitioner argues that Patent Owner fails to address the theory explained in the Petition that "a POSA following Erickson's suggestion would rely on Tanenbaum[]'s explanation of the TCP fast path so that, after the connection is set up by the host on the slow path using the first processor, the second processor on the I/O device in Erickson would update the connection record which maintains TCP state." Pet. Reply 18. In response to Patent Owner's argument that Erickson is limited to the "transmit" side, Petitioner further argues, "[w]hile the exemplary UDP script was on the transmit side, Erickson explicitly discloses both fast path receive and transmit," and "[c]reating receive side scripts would have been within the skill of a POSA." *Id.* (citing Pet. 66–68; Ex. 1003 ¶¶ 136–146, Appendix A § 1.3).

After full consideration of the parties' respective arguments and evidence, we are persuaded, for the reasons stated by Petitioner and discussed above, that Petitioner has established by a preponderance of the evidence that Erickson in view of Tanenbaum teaches updating TCP state information by a second processor. Patent Owner's arguments are not persuasive to rebut Petitioner's showing. As stated above, we disagree with Patent Owner's contention that Tanenbaum teaches away from the use of a second processor, and we further find that Patent Owner's arguments are not directed to the specific combination of teachings that Petitioner relies upon.

Cf. PO Resp. 46–48. Accordingly, we are persuaded that this limitation is taught by Erickson in view of Tanenbaum.

* * *

For the above reasons, we are persuaded, for the reasons stated by Petitioner and discussed above, that Petitioner has established by a preponderance of the evidence that all limitations of claim 1 are taught or suggested by the combination of Erickson and Tanenbaum.

b. Claims 2 and 3

Claim 2 depends from claim 1 and further recites that the communication processing mechanism includes a "receive sequencer with directions to classify [the] packet" and that the packet "contains control information corresponding to the stack of protocol layers." Ex. 1001, 99:11–15. Claim 3 depends from claim 1 and further recites that the communication processing mechanism includes a "receive sequencer with directions to generate a summary of a second message packet received from the network," where the second packet "contain[s] control information corresponding to the stack of protocol layers," and the recited instructions "includ[e] an instruction to compare said summary with said context." *Id.* at 99:16–22.

In support of its contention that the combination of Erickson and Tanenbaum renders claim 2 unpatentable, Petitioner argues, among other things, that Erickson teaches classifying packets by protocol type because each requires a different script, and that it would have been obvious to adapt Erickson to include a receive sequencer, as taught by Tanenbaum's transport entity, to distinguish between fast and slow path processing using Tanenbaum's fast path "header prediction." Pet. 70–71 (citing Ex. 1005,

5:41–51; Ex. 1006, 567; Ex. 1003 ¶ 145, Appendix A § 2.1). Petitioner also notes that "Erickson discloses a slow path (Slow Application) and fast path (Fast Application) and thus teaches the concept of classifying packets for each path." *Id.* at 70 n.11 (citing Ex. 1005, Fig. 3). In support of its contention that the combination of Erickson and Tanenbaum renders claim 3 unpatentable, Petitioner makes a similar argument as for claim 2, that "it would have been obvious to combine Erickson with Tanenbaum[]'s header prediction teachings," and further argues that Tanenbaum "discloses that the receive sequencer (the 'transport entity' and header prediction) produces a summary of the incoming packets (and thus a 'second packet')." *Id.* at 73.

In its Response, Patent Owner contends that both Erickson and Tanenbaum "are silent" regarding a "receive sequencer" that is on a "communication processing mechanism." PO Resp. 48. "[E]ven considering the combination of *Erickson* and *Tanenbaum*," Patent Owner argues, "a POSITA would not find it obvious to move the receive sequencer from the host to the communication processing mechanism, such as an I/O adaptor." *Id.* at 49. Citing Dr. Almeroth's declaration, Patent Owner contends that Petitioner's arguments are based on hindsight. *Id.* (citing Ex. 2026 ¶ 114).

Petitioner counters that Tanenbaum "discloses that its 'transport entity' may reside on the network interface card," and that "[i]t would have been a straightforward design choice, in light of the teachings in Erickson, to place the bypass test, which included the well-known header prediction, from Tanenbaum[]'s transport entity onto the I/O adapter." Pet. Reply 18–19 (citing Ex. 1006, 480, 512; Ex. 1003 ¶¶ 145–149, Appendix A §§ 1.P.3, 2.1, 3.1).

Having considered the parties' respective arguments and evidence, we are persuaded that the combination of Erickson and Tanenbaum teaches or suggests the limitations of claims 2 and 3 for the reasons stated by Petitioner. Because Tanenbaum explicitly discloses that "[t]he transport entity can be . . . on the network interface card" (Ex. 1006, 480), Patent Owner's arguments to the contrary are not persuasive.

c. Claims 4–7

Claims 4–7 depend from claim 1. Ex. 1001, 99:23–39. In support of its contentions, Petitioner persuasively maps Erickson's and Tanenbaum's teachings to each limitation recited in claims 4–7. Pet. 76–88 (citing Ex. 1005, 4:53–5:14, 5:41–51, 5:53–67, 6:1–10, 6:57–7:4, 7:39–47, 8:17–37 Figs. 3–6; Ex. 1006, 479–80, 526, 536–37, 566–67, Fig. 6-24; Ex. 1003, ¶¶ 46–47, 90–92, 141, 143, 144, Appendix A §§ 4.1–7.1). Patent Owner does not provide any separate argument with respect to claims 4–7 in the Patent Owner Response. We have considered the evidence cited in the Petition and are persuaded, for the reasons presented by Petitioner, that Petitioner has carried its burden to demonstrate by a preponderance of the evidence that the combination of Erickson and Tanenbaum teaches or suggests each of the limitations recited in claims 4–7.

5. Secondary Considerations

Patent Owner argues that "strong evidence of secondary considerations weighs against obviousness" of the challenged subject matter. PO Resp. 49 (emphasis omitted). In particular, Patent Owner contends that the claimed invention addresses a long-felt yet unresolved need in the art for accelerated network communications, that the claimed inventions were commercially successful, that the claimed invention received praise in the

industry, that many others tried and failed to develop the claimed technology, and that experts were skeptical of the claimed invention and taught away from it. *Id.* at 49–56. Petitioner responds that Patent Owner has failed to show any nexus between the alleged objective evidence and the features of the challenged claims, as neither Patent Owner nor its expert ties any of Patent Owner's products or the alleged "claimed network acceleration technologies" to any limitation of any claim. Pet. Reply 19. We address these arguments in turn.

a. Long-felt, yet unsatisfied need

Patent Owner alleges that there was significant demand, beginning at least in the early 1990s and recognized in academic papers and prior art publications, "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 clear and direct" insofar as the accelerated network processing technologies recited in the challenged claims solved recognized "bottlenecks" in data communications caused, for example, by the processing of protocols. PO Resp. 50–51 (citing Ex. 2026 ¶¶ 116–117; Exs. 2031–2034). Petitioner responds that "Patent Owner provides no evidence that the 'accelerated network processing technologies recited in the challenged claims' actually relate to the 'challenged claims,'" and that Patent Owner's "only support is its expert declaration, which is identical to the Response and likewise has no support." Pet. Reply 20.

We agree with Petitioner that Patent Owner's arguments are insufficient to establish a nexus between the alleged "long-felt, yet unresolved need" and the challenged claims. Although Patent Owner provides citations to four references that afford evidence of networking

bottlenecks (Exs. 2031–2034), 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, evidence of secondary considerations must be shown to have a nexus with the claimed invention. *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 In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994). 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, here, to the extent that offloading protocol processing could be regarded as solving any long-felt need, we note that Erickson previously disclosed offloading protocol processing. 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).

b. Commercial success and licensing

Patent Owner argues that "[t]he features described in the challenged claims also enjoyed great commercial success for over a decade" and that "the offloading and other network acceleration technology described in the challenged claims became 'the *de facto* standard' in network acceleration techniques shortly after its introduction and is still the standard today." PO

Resp. 51–52 (citing Ex. 2026 ¶ 118). Patent Owner further contends that its "patent portfolio covering network acceleration techniques was the subject of several successful commercial licenses to many large network and storage players in the industry" and that "[t]his remarkable commercial success was attributed to Patent Owner's network acceleration technology." *Id.* at 52 (citing Ex. 2026 ¶ 119).

Petitioner responds that Patent Owner provides no support for its assertions other than paragraphs in its expert declaration that are identical to the paragraphs in its response and are likewise entirely unsupported. Pet. Reply 20–21. Petitioner also argues 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. *Id.* at 21–23. Rather, Petitioner contends, Patent Owner does not attempt to tie the '036 patent to these licenses, the '036 patent is not mentioned in any of the licenses, and the licenses "resulted from a lawsuit . . . asserting that Microsoft's software and Broadcom's hardware were infringed by different patents on [TCP Offload Engine ("TOE")] technology," as a result of which lawsuits Microsoft and Broadcom took a license and a handful of other manufacturers also took licenses so they could utilize certain Microsoft software that supported the TOE technology. *Id.* at 22–23 (citing Ex. 1227; Ex. 2038).

We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. *Id.* at 20–23. We agree with Petitioner that 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, 1228, 1230). Further, Patent Owner fails to show that its licensing program was successful because of the merits of claims 1–7 of the '036 patent, as opposed to, for example, other of the patents in Patent Owner's licensed portfolio, business decisions to avoid litigation, prior business relationships, or for other economic reasons. Although "there is a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product 'is the invention disclosed and claimed in the patent'" (*WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1339 (Fed. Cir. 2016) (quoting *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997)), Patent Owner carries the burden of demonstrating that the "thing . . . that is commercially successful is the invention disclosed and claimed in the patent" (*Demaco*, 851 F.2d at 1392). Moreover, "[w]hen the thing that is commercially successful is not coextensive with the patented invention . . . the patentee must show prima facie a legally sufficient relationship between that which is patented and that which is sold." *Demaco*, 851 F.2d at 1392. Patent Owner has not made such a showing in this case. Additionally, we note that Patent Owner relies on the essentially the same evidence and arguments when asserting secondary considerations for at least eight other patents. *See* Cases IPR2017-01392 (concerning U.S. Patent No. 7,337,241 B2); IPR2017-01393 (concerning U.S. Patent No. 9,055,104 B2); IPR2017-01405 (concerning U.S. Patent No. 7,124,205 B2); IPR2017-01406 (concerning U.S. Patent No. 7,673,072 B2); IPR2017-01409 and IPR2017-01410 (both concerning U.S. Patent No. 8,131,880 B2); IPR2018-00226 (concerning U.S. Patent No. 7,124,205 B2); IPR2018-00234

(concerning U.S. Patent No. 8,805,948 B2); and IPR2018-00401 (concerning U.S. Patent No. 7,945,699 B2). This casts further doubt on the existence of a legally sufficient relationship between the alleged commercial success and the claimed subject matter in *this* case. Still further, even assuming that the claimed invention experienced "commercial success" or "successful commercial licens[ing]" as Patent Owner alleges, we find that offloading protocol processing, at least, was previously disclosed by Erickson. *See* discussion above. Thus, to the extent Patent Owner's alleged commercial success or licensing resulted from that feature, that 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).

c. Industry praise

Patent Owner alleges that "[t]he industry universally praised commercial embodiments of the features described in the challenged claims." PO Resp. 53. In particular, Patent Owner contends that HP found that Patent Owner's NIC was "able to sustain network bandwidth comparable to that of Native NT for large messages, which is close to wire-speed" and "achiev[e] lower processor utilization than native NT's TCP/IP protocol stack for transmission of large enough messages" and that the test performance of Patent Owner's iNIC was "definitely better than [HP's] offload." *Id.* (citing Ex. 2026 ¶ 121; Ex. 2039 ¶ 4). Patent Owner also cites a technology analyst as opining in 2011 that a particular Alacritech product was "an evolutionary advancement of Alacritech's long standing leadership in protocol acceleration" and that "Alacritech is setting the stage for a next generation of solutions that will accelerate storage from outside the storage array." *Id.* (quoting Ex. 2040). Patent Owner further contends that the

analyst "call[ed] the patented technology 'game-changing.'" *Id.* (citing Ex. 2040, 3; Ex. 2026 ¶ 122). Petitioner responds that Patent Owner "has provided no evidence that its products practice the challenged claims." Pet. Reply 23.

Notwithstanding Patent Owner's arguments and reliance on Exhibits 2039 and 2040, we again agree with Petitioner (Pet. Reply 19–20, 23) that Patent Owner has not established a nexus between the challenged claims and the alleged objective evidence. Whereas Patent Owner argues, for example, that 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. 53 (citing Ex. 2039 ¶ 4; Ex. 2040; Ex. 2026 ¶¶ 121–122)), 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, if so, in what way. Likewise, whereas Patent Owner contends an analyst "call[ed] the patented technology 'game changing'" (*id.*), the evidence indicates only that the analyst reported that he had "talked to early-stage customers using the product"—referring in context to one specific product, to which Patent Owner has not persuasively established any connection with the challenged claims—"and they believe it's game-changing" (Ex. 2040, 3). And again, we note that Patent Owner relies on the same evidence and arguments when asserting secondary considerations for other patents in Cases IPR2017-01392, IPR2017-01393, IPR2017-01405, IPR2017-01406, IPR2017-01409, IPR2017-01410, IPR2018-00226, IPR2018-00234, and IPR2018-00401, casting further doubt on any alleged

nexus between the alleged "praise" and the specific subject matter of the challenged claims in this case.

d. Failure of others

Patent Owner argues that "prior attempts at 'TCP offload [have] repeatedly failed'" as a "result of the 'complexities of deploying TCP offload in practice.'" PO Resp. 54 (alteration in original) (citing Ex. 2041, 2). Patent Owner alleges that "[t]he TCP offload described above is a form of network processing offload that is described by the challenged claims, and this failure of others therefore has a direct nexus to the claimed inventions." *Id.* (citing Ex. 2026 ¶ 123). Petitioner responds that "Patent Owner provides no evidence of nexus between the single article it cites and the features of the ['036 Patent." Pet. Reply 24. We again agree with Petitioner. Even if TCP offload is a form of network processing offload, Patent Owner provides no evidence linking the failure of others to any limitations of the challenged claims.

e. Skepticism

Patent Owner argues that "experts and industry were skeptical of offloading processing of complex protocols such as TCP/IP, and expressly taught away from offloading." PO Resp. 54. Patent Owner points specifically to the same portion of Tanenbaum that it relied upon previously as teaching away from the claimed invention, as well as to a Paper published by Dr. Horst that Patent Owner alleges "expressed a high level of skepticism that offloading would result in any beneficial results." *Id.* at 54–56 (citing Ex. 1006, 570–571; Ex. 2300, 194). Petitioner responds that, while Tanenbaum "states a preference for an alternative because of expense and complexity, it never suggests a 'plug-in board with a second CPU and its

own program' will not work with a fast-enough processor, regardless of the offload protocol," and furthermore, "Dr. Horst's article in fact confirms the 'conventional wisdom' was that special purpose NICs were used for TCP/IP." Pet. Reply 24. Accordingly, Petitioner contends, Patent Owner's reliance on Tanenbaum and Dr. Horst's article is misplaced. *Id.*

We are not persuaded by Patent Owner's argument for at least the reasons set forth by Petitioner. Further, as previously discussed, Erickson, 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) that a person of ordinary skill in the art would have recognized to have already been disclosed in the prior art (e.g., Erickson).

6. Conclusion of Obviousness

Patent Owner's proffered evidence of alleged secondary considerations does not overcome Petitioner's strong evidence regarding the teachings of Erickson and Tanenbaum with respect to the subject matter of claims 1–7. Accordingly, for the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1–7 would have been obvious to a person of ordinary skill in the art at the time of the invention over Erickson and Tanenbaum.

C. Patent Owner's Motion to Exclude

In *inter partes* review proceedings, documents are admitted into evidence subject to an opposing party asserting objections to the evidence and moving to exclude the evidence. 37 C.F.R. § 42.64.

Patent Owner moves to exclude Tanenbaum as "irrelevant, as Petitioner has failed to establish that [it] is prior art." Paper 56, 2–6. Patent Owner also moves to exclude Exhibit 1011, the Declaration of Rice Majors regarding Tanenbaum ("Majors Declaration"), contending that "it is inadmissible hearsay and inadmissible layman opinion." *Id.* at 2, 6–9

Petitioner responds that Patent Owner's arguments are directed at the sufficiency of Petitioner's evidence, not the admissibility of Tanenbaum. Paper 60, 3. Moreover, Petitioner contends, Patent Owner never objected to the relevance of Tanenbaum and, accordingly, waived the opportunity to move to exclude it. *Id.* at 4 (citing Paper 10 (Patent Owner's Objections to Evidence)).

Federal Rule of Evidence 401 provides that evidence is relevant if "it has any tendency to make a fact more or less probable than it would be without the evidence" and "the fact is of consequence in determining the action." Both the Federal Circuit and the Board have recognized that there is a "low threshold for relevancy." *See, e.g., OddzOn Prods., Inc. v. Just Toys, Inc.*, 122 F.3d 1396, 1407 (Fed. Cir. 1997); *Laird Techs., Inc. v. GrafTech Int'l Holdings, Inc.*, Case IPR2014-00025, slip op. at 44 (PTAB Mar. 25, 2015) (Paper 45) ("*Laird Techs.*"). There is no question that Tanenbaum is relevant to the patentability of the challenged claims in this case. Tanenbaum is a widely recognized and readily accessible reference explaining network protocols including UDP, TCP, and IP. Further, as Petitioner points out, the record does not show that Patent Owner timely objected to Tanenbaum on the basis of relevance, and Patent Owner, accordingly, waived that objection. *See* Paper 10, 3 (raising objections to

Tanenbaum under FRE 901 (authentication) and 801 (hearsay), but not under FRE 401 (relevance)).

Accordingly, we deny Patent Owner's Motion to Exclude as it relates to Tanenbaum.

We also dismiss as moot Patent Owner's Motion to Exclude as it relates to the Majors Declaration because we do not rely on that declaration in rendering this Decision.

D. Petitioner's Motion to Exclude

Petitioner moves to exclude portions of Dr. Almeroth's declaration (Exhibit 2026) because, according to Petitioner, portions thereof "are identical to the arguments in" 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.

Although we agree with Petitioner that significant portions of Dr. Almeroth's declaration indeed are identical to arguments Patent Owner's Response[5] and lack disclosure of underlying facts or data on which they are based, we nonetheless agree with Patent Owner that "Petitioner's complaints go to the weight of Dr. Almeroth's opinions and not their admissibility."

[5] Two particularly egregious examples are noted in Petitioner's Reply in Support of its Motion to Exclude, citing two instances in which Dr. Almeroth's Declaration includes the phrase "[a]s explained by Dr. Almeroth" to introduce Dr. Almeroth's own alleged testimony. *See* Paper 63, 1 (citing Ex. 2026 ¶¶ 110, 114).

Paper 61, 4. As explained in *Laird Techs.*, "[a] motion to exclude . . . is not an appropriate mechanism for challenging the sufficiency of evidence or the proper weight that should be afforded an argument." Case IPR2014-00025, slip op. at 42 (Paper 45). Moreover, "[o]ur general approach for considering challenges to the admissibility of evidence was outlined in *Corning Inc. v. DSM IP Assets B.V.*, Case IPR2013-00053, slip op. at 19 (PTAB May 1, 2014) [(Paper 66)]," which stated that, "similar to a district court in a bench trial, the Board, sitting as a non-jury tribunal with administrative expertise, is well-positioned to determine and assign appropriate weight to evidence presented." *Id.* (citing *Donnelly Garment Co. v. NLRB*, 123 F.2d 215, 224 (8th Cir. 1941) ("One who is capable of ruling accurately upon the admissibility of evidence is equally capable of sifting it accurately after it has been received . . . .")). Accordingly, we deny Petitioner's motion to exclude.

E. Patent Owner's Contingent Motion to Amend

Patent Owner filed a contingent motion to substitute independent claim 1 with proposed claim 23, and dependent claims 2–7 with proposed claims 24–29, respectively, if the original claims are found unpatentable. Mot. Amend.

Before considering the patentability of any substitute claims, we first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. A motion to amend may "cancel any challenged patent claim" or, for each challenged claim, "propose a reasonable number of substitute claims." 35 U.S.C. § 316(d)(1). Our corresponding rule provides that "[t]he presumption is that only one substitute claim would be needed to replace

each challenged claim." 37 C.F.R. § 42.121(a)(3). Furthermore, a motion to amend "may not enlarge the scope of the claims of the patent or introduce new matter." 35 U.S.C. § 316(d)(3). Our corresponding rule provides that "[a] motion to amend may be denied where . . . [t]he amendment seeks to enlarge the scope of the claims of the patent or introduce new subject matter." 37 C.F.R. § 41.121(a)(2)(ii).

In the Federal Circuit's *en banc* decision in *Aqua Products, Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017), the lead plurality opinion explains that "the patent owner must satisfy the Board that the statutory criteria in § 316(d)(1)(a)–(b) and § 316(d)(3) are met and that any reasonable procedural obligations imposed by the Director are satisfied." *Id.* at 1305–06; *see also id.* at 1341 ("There is no disagreement that the patent owner bears a burden of production in accordance [with] 35 U.S.C. § 316(d)." (Reyna, J., writing for a majority)).

On November 21, 2017, the Office provided guidance on motions to amend in view of *Aqua Products*. *See* "Guidance on Motions to Amend in view of *Aqua Products*" (Nov. 21, 2017) (https://www.uspto.gov/sites /default/files/documents/guidance_on_motions_to_amend_11_2017.pdf). In that Guidance, the Office explained:

> In light of the *Aqua Products* decision, the Board will not place the burden of persuasion on a patent owner with respect to the patentability of substitute claims presented in a motion to amend. . . . Thus, for example, if the entirety of the evidence of record before the Board is in equipoise as to the unpatentability of one or more substitute claims, the Board will grant the motion to amend with respect to such claims, and the Office will issue a certificate incorporating those claims into the patent at issue.

> Beyond that change, generally speaking, practice and procedure before the Board will not change. For example, a patent owner still must meet the requirements for a motion to amend under 37 C.F.R. § 42.121 or § 42.221, as applicable. That is, a motion to amend must set forth written description support and support for the benefit of a filing date in relation to each substitute claim, and respond to grounds of unpatentability involved in the trial.

Id. at 2.

We, therefore, determine whether Patent Owner has met its burden of production of a threshold of evidence sufficient to establish that its Motion to Amend complies with 35 U.S.C. § 316(d)(1)(a)–(b), § 316(d)(3), and 37 C.F.R. § 42.121.

1. Insufficient Written Description for Substitute Claims

With regard to written description support for the proposed substitute claims, Patent Owner's Motion to Amend merely argues:

> The chart included in **Appendix A** indicates where support can be found for the substitute claims from the original disclosure of the '036 Patent—from U.S. App. No. 10/260,112 ("the '112 Application") (Exhibit 2020).
>
> . . .
>
> The '036 Patent claim[s] priority to U.S. Prov. App. No. 60/061,809, filed on Oct. 14, 1997. "Support in an earlier-filed disclosure" for which "benefit of the filing date of the earlier filed disclosure is sought" is shown in the chart included as **Appendix B**.

Mot. Amend 3–4.

Initially, we find Patent Owner's argument in the Motion to Amend itself is insufficient to satisfy Patent Owner's threshold burden of production, because it merely indicates that the required written description support can be found elsewhere, namely, in the claim charts included in

Appendixes A and B.[6] *See id.* Even taking into account the information provided in the cited claim charts, however, the Motion to Amend still fails to produce sufficient evidence of written description support for each substitute claim. For example, the claim chart entry in Appendix A for substitute claim 23 (replacing independent claim 1) is reproduced below:

[6] We note that Patent Owner, with leave from the Board, filed as Paper 58 corrected exhibits to its Motion to Amend on June 15, 2018. References here and below to Appendixes A and B refer to the corrected exhibits.

Claims	Exemplary Support in the '112 Application
Proposed Claim 23	
~~1~~23. A device for use with a first apparatus that is connectable to a second apparatus, the first apparatus containing a memory and a first processor operating a stack of protocol processing layers that create a context for communication, the context including a media access control (MAC) layer address, an Internet Protocol (IP) address and Transmission Control Protocol (TCP) state information, the device comprising:	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1.
a communication processing mechanism connected to the first processor,	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1.
said communication processing mechanism containing a second processor	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1.
running instructions on the second processor, wherein the second processor determining whether an incoming message packet should be processed by the second processor,	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1.
if the incoming message packet should be processed by the second processor, ~~to~~ processing the ~~a~~ incoming message packet, without involving the stack of processing protocol processing layers, such that the context is employed to transfer data contained in said packet to the first apparatus memory and the TCP state information is updated by said second processor,	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1..
if the incoming message packet should not be processed by the second processor, passing the incoming message packet to the first processor for further processing.	*See*, *e.g.*, Ex. 2020 at Abstract, Figs. 1-3, 4A-4D, and 5-12, Pages 7-8, 10-17, Cl. 1.

Paper 62, Appendix A at i–ii. Patent Owner's Appendix A claim chart for substitute claim 23, reproduced above, provides string citations to figures and paragraphs of Exhibit 2020 but provides no explanation as to how the citations disclose the corresponding claim element.

> In its Opposition to the Motion to Amend, Petitioner argues:
>
> > Patent Owner has used string citations to broad swaths of pages and figures in the disclosures (in fact, **the exact same pages and figures** in the original disclosure for each limitation of claim 23) without any attempt to explain how the substitute claim[] [is] supported by those disclosures. It is not Petitioner's or the Board's job to sift through these repetitive string citations to piece together Patent Owner's claim of support.

Resp. Mot. Amend 2; *see also id.* at 8–10.

In its Reply, Patent Owner explains how the string citations in the claim chart of Appendix A allegedly disclose the elements of claims 23–29. PO Reply 6–13. Patent Owner further argues that Petitioner's reliance on *Respironics*[7] is inapposite because "it is premised upon precedent that has been overturned" by *Aqua Products*. *Id.* at 6. Patent Owner contends *Aqua Products* held that the Petitioner has the burden of persuasion to prove unpatentability and the Patent Owner "need only satisfy its burden of production," which Patent Owner contends it has done. *Id.*

Patent Owner correctly characterizes the holding of *Aqua Products* that it need only meet the burden of production. However, we disagree with Patent Owner that *Aqua Products* in any manner overturned the Board's decision in *Respironics*. As the Board found in *Respironics*, mere string citations without explanation are insufficient to meet even this lower threshold burden of production. 2014 WL 4715644, at *13; *see also B.E. Tech., L.L.C. v. Google, Inc.*, 2016 WL 6803057, at *7 (Fed. Cir. 2016) (agreeing with Board that a patent owner did not meet its burden to show

[7] *Respironics, Inc. v. Zoll Med. Corp.*, Case No. IPR2013-00322, 2014 WL 4715644, at *13 (P.T.A.B. Sept. 17, 2014), *vacated and remanded on other grounds*, 656 F. App'x 531 (Fed. Cir. 2016).

written description support for proposed substitute limitations in motion to amend where the patent owner provided only a string citation without explaining how the cited material supported each of the proposed substitute limitations); *Greene's Energy Grp., LLC v. Oil States Energy Servs., LLC*, No. IPR2014–00216, 2015 WL 2089371, at *14 (PTAB May 1, 2015) ("A string citation does not explain how the original disclosure of the application relied upon reasonably conveys to a person the features intended to be encompassed by the proposed substitute claims."), *aff'd*, 639 F. App'x 639 (Fed. Cir. 2016), *aff'd sub nom. Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 138 S.Ct. 1365 (2018). It is unclear, for example, whether such citations are to be understood as a combination of disclosures that, taken together, disclose the corresponding element, or whether Patent Owner contends that each citation of the string citations is sufficient to disclose the corresponding element. In that regard, Patent Owner provides the same string citations for all of the elements of substitute claim 23. It is not the responsibility of the Board to search through the string citations to find sufficient written description support for each element and we decline Patent Owner's invitation to do so. *See Respironics*, 2014 WL 4715644, at *13 ("Zoll's string citations amount to little more than an invitation to us (and to Respironics, and to the public) to peruse the cited evidence and piece together a coherent argument for them. This we will not do; it is the province of advocacy.").[8]

[8] *See also Stampa v. Jackson*, 78 USPQ2d 1567, 1571 (BPAI 2005) (quoting *Ernst Haas Studio, Inc. v. Palm Press, Inc.*, 164 F.3d 110, 111–12 (2d Cir. 1999) ("Appellant's Brief is at best an invitation to the court to scour the record, research any legal theory that comes to mind, and serve generally as an advocate for appellant. We decline the invitation.")).

For these reasons, Patent Owner has failed to meet its burden of production, *in its Motion or in the claim charts* in its corrected exhibits, to identify written description support for each substitute claim, and we, accordingly, have grounds to deny the Motion to Amend on this basis. Nevertheless, we additionally address below whether the proposed substitute claims improperly enlarge the scope of the claims.

2. Proposed Substitute Claim 23 Improperly Broadens Claim 1

Proposed substitute claim 23 would amend original claim 1 by replacing the clause in claim 1 reciting "said communication processing mechanism containing a second processor running instructions to process a message packet such that the context is employed to transfer data contained in said packet to the first apparatus memory and the TCP state information is updated by said second processor" with the following:

> said communication processing mechanism containing a second processor running instructions on the second processor, wherein the second processor determining [sic] whether an incoming message packet should be processed by the second processor,
>
> > if the incoming message packet should be processed by the second processor, processing the incoming message packet, without involving the stack of processing protocol processing layers, such that the context is employed to transfer data contained in said packet to the first apparatus memory and the TCP state information is updated by said second processor,
> >
> > if the incoming message packet should not be processed by the second processor, passing the incoming message packet to the first processor for further processor.

Mot. Amend 2–3; Paper 58, Appendix A at i–ii.

Petitioner argues in its Response to the Motion to Amend that proposed substitute independent claim 23 broadens the scope of claim 1, that Patent Owner does not show adequate written description support for the proposed substitute claims, that the proposed substitute claims are indefinite, and that the proposed substitute claims are obvious over Erickson and Tanenbaum. Resp. Mot. Amend 1–24. For the reasons set forth below, we are persuaded by Petitioner's argument that proposed claim 23 improperly broadens the scope of claim 1 and, accordingly, deny Patent Owner's Contingent Motion to Amend.

Patent Owner contends that "the proposed substitute claims ***narrow***—not broaden—the original claims," as "[s]ubstitute independent claim 23 includes all of the original features of original independent claim 1" as well as "additional steps," and "[p]roposed dependent claim[s] 24–29 are identical to dependent claims 2–7." Mot. Amend 2–3.

In its Response, Petitioner argues that, contrary to Patent Owner's contentions, claim 23 does not merely add "additional steps" but "instead added an alternative to a recited step," and thus improperly "expanded the substitute claims to include devices that would not have been covered by the original claims." Resp. Mot. Amend. 3–4. Petitioner points out that "claim 1 requires a 'second processor running instructions to process a message packet,'" corresponding to the "fast path" described in the '036 patent and related applications. *Id.* at 4–5. Petitioner argues that claim 1, accordingly, "was only met by devices practicing the 'fast path' (*i.e.*, a 'second processor running instructions to process a message packet . . .')." *Id.* at 5. In substitute claim 23, Petitioner contends, "Patent Owner has modified the language to require the 'second processor' to first

'determine[] whether an incoming message packet should be processed by the second processor," and "[b]ased on that determination, . . . the message packet is either processed by the 'second processor' or the 'first processor.'" *Id.* Thus, Petitioner contends, "[s]ubstitute claim 23 covers devices where the determination is **always** made to pass the message packet to the 'first processor' without the second processor 'transfer[ring] data contained in said packet to the first apparatus memory and the TCP state information [being] updated by said second processor," which device "would not have infringed original claim 1." *Id.* at 6–7. According to Petitioner:

> While Patent Owner has otherwise narrowed substitute claim 23 in certain ways (e.g., changing "message packet" to "incoming message packet" and requiring processing by the "second processor . . . without involving the stack of processing protocol processing layers"), this does not change the fact that substitute claim 23 has been broadened to include devices that pass packets to the first processor without the second processor transferring data contained in the packet to the first apparatus memory (among other limitations). Such a device would not have infringed original claim 1. *In re Bennett*, 766 F.2d 524, 526 (Fed. Cir. 1985) (en banc) ("[A] claim is broadened if it is broader in any respect than the original claim, even though it may be narrowed in other respects."). Accordingly, Patent Owner cannot meet its burden of demonstrating that the substitute claims do not expand the scope of the claims of the 036 Patent.

Id. at 7.

In its Reply to Petitioner's Response, Patent Owner quotes its declarant Dr. Almeroth as opining that "the amendments narrow the original claims by requiring ***additional*** steps and ***removing none***." Reply Mot. Amend 1 (quoting Ex. 2305 (Declaration of Dr. Almeroth in Support of Patent Owner's Reply in Support of Motion to Amend), ¶ 81). Patent Owner argues substitute claim 23 adds to claim 1 "by further disclosing

what needs to be done by 'running instructions,' in particular, reciting a wherein clause that adds a new determining step." *Id.* at 1–2. Patent Owner further contends Petitioner's argument that claim 23 recites an alternative way of processing incoming message packets by bypassing the second processor is incorrect because "[s]ubstitute claim 23 ***maintains*** the requirement of a second processor to run instructions." *Id.* at 2 (quoting Ex. 2305 ¶ 83). Patent Owner still further contends that, because "[s]ubstitute claim 23 requires a new determination whether an incoming message packet should be processed by the second processor and a device capable of taking two resultant actions depending on the outcome of the determination" (*id.* at 3–4 (quoting Ex. 2305 ¶ 84)), "a device infringing substitute claim 23 must include ***additional functionality*** in order to infringe (*i.e.*, the second processor determining whether an incoming packet should be processed by the second processor and an alternative processing path flowing through the second processor and the first processor)" (*id.* at 4). Patent Owner argues, "[b]ecause no conceivable apparatus or process would infringe the substitute claims without infringing the original claims, the substitute claims have not been broadened." *Id.*

We disagree with Patent Owner's premise that "no conceivable apparatus . . . would infringe the substitute claims without infringing the original claims," as well as with its conclusion that the substitute claims have not been broadened." *See id.* First, as Petitioner explains in its Sur-Reply in Opposition to the Motion to Amend, Patent Owner's argument that substitute claim 23 "***maintains*** the requirement of a second processor to run instructions" (Reply Mot. Amend 2) is unavailing because claim 23 "**change[s]** what those instructions are" (Sur-reply Mot. Amend 1).

Specifically, "[i]n claim 1, the second processor ran instructions to 'process a message packet,' while in substitute claim 23, the second processor runs instructions to 'determin[e]' whether the incoming message packet should be 'processed' by the second processor or first processor," and "[i]n other words, there is no requirement in substitute claim 23 that the second processor 'processes' any packets." *Id.* at 1–2. Second, as Petitioner also explains, although claim 23 requires "additional functionality" with respect to the determining step (i.e., insofar as "a device that infringes substitute claim 23 'determine[s]' whether a packet should be processed by the 'second processor' or 'first processor'"), it simultaneously alters the requirement of claim 1 that an infringing device must include "a second processor running instructions *to process a message packet*," by not requiring that the second processor "process a message packet." *Id.* at 2–3. Thus, a device containing a second processor that runs instructions determining whether an incoming message packet should be processed by the second processor and always answers that determination in the negative—and hence always "pass[es] the incoming message packet to the first processor for further processing"—could potentially infringe proposed substitute claim 23 without infringing original claim 1. We conclude, therefore, that the substitute claims are improper as enlarging the scope of the claims. *See In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1283 (Fed. Cir. 2015) ("[A] claim is broader in scope than the original claims if it contains within its scope any conceivable apparatus or process which would not have infringed the original patent." (quotations omitted)).

Accordingly, in addition to Patent Owner's failure to meet its burden to identify written description support for each substitute claim (*see supra*

Section III.E.1), Patent Owner's enlargement of the scope of the claims provides an independent basis for denial of Patent Owner's Motion to Amend.

F. Real Parties in Interest

Intel Corporation identified itself as a real party in interest in this proceeding and represented that "[n]o other parties exercised or could have exercised control over this petition; no other parties funded or directed this Petition." Pet. 2–3. Patent Owner argues that "[t]he Board should terminate this IPR proceeding because the Petition fails to identify all real parties-in-interest as required by 35 U.S.C. § 312(a)(2) and 37 CFR § 42.8(b)(1)." PO Resp. 56. Patent Owner contends, for example, that "Dell is . . . Intel'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 "the fact that Cavium, Intel, Dell, and Wistron all filed almost verbatim petitions and share the same expert is compelling evidence that they were in privy and cooperating in the drafting of each other's petitions." *Id.* at 57.

We note that we previously addressed Patent Owner's arguments in this regard both in our Decision on Institution and in an Order denying Patent Owner's request for additional discovery and associated supplemental briefing with respect to real parties in interest in light of the intervening decision of the U.S. Court of Appeals for the Federal Circuit in *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336 (Fed. Cir. 2018). *See* Dec. 3–6; Paper 67, 2–3. We additionally note that Cavium, Dell, and Wistron are all acknowledged real parties in interest in this proceeding by

virtue of their having joined as parties to this proceeding. Accordingly, we are therefore not persuaded by Patent Owner's argument.

G. Patent Owner's Motion to Seal

On March 15, 2018, the parties filed a Joint Motion to Enter a Stipulated Protective Order (Paper 34), which was granted on March 27, 2018 (Paper 35).

Patent Owner requests that we seal Exhibit 2038 due to the inclusion of certain licensing terms that Patent Owner regards as confidential. Paper 28. There is a strong public policy in favor of making information filed in an *inter partes* review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. *See Garmin Int'l, Inc. v. Cuozzo Speed Techs., LLC*, Case IPR2012-00001 (PTAB Mar. 14, 2013) (Paper 34). Under 35 U.S.C. § 316(a)(1) and 37 C.F.R. § 42.14, the default rule is that all papers filed in an *inter partes* review are open and available for access by the public; a party, however, may file a concurrent motion to seal and the information at issue is sealed pending the outcome of the motion. It is, however, only "confidential information" that is protected from disclosure. 35 U.S.C. § 316(a)(7); *see* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,760 (Aug. 14, 2012). The standard for granting a motion to seal is "for good cause." 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof in showing entitlement to the requested relief, and must explain why the information sought to be sealed constitutes confidential information. 37 C.F.R. § 42.20(c).

In reviewing the Exhibit 2038, we conclude that it may contain confidential information. Accordingly, we are persuaded that good cause

exists to have the identified portions remain under seal, and the Motion To Seal is granted.

The Office Patent Trial Practice Guide provides:

> *Expungement of Confidential Information*: Confidential information that is subject to a protective order ordinarily would become public 45 days after denial of a petition to institute a trial or 45 days after final judgment in a trial. There is an expectation that information will be made public where the existence of the information is referred to in a decision to grant or deny a request to institute a review or is identified in a final written decision following a trial. A party seeking to maintain the confidentiality of information, however, may file a motion to expunge the information from the record prior to the information becoming public. § 42.56. The rule balances the needs of the parties to submit confidential information with the public interest in maintaining a complete and understandable file history for public notice purposes. The rule encourages parties to redact sensitive information, where possible, rather than seeking to seal entire documents.

77 Fed. Reg. at 48761.

Consequently, 45 days from entry of this decision, all information subject to a protective order will be made public by default. In the interim, Patent Owner may file a motion to expunge any such information that is not relied upon in this Decision. *See* 37 C.F.R. § 42.56.

IV. ORDER

Accordingly, for the foregoing reasons, it is

ORDERED that claims 1–7 of U.S. Patent No. 7,237,036 are held unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude Exhibit 1006 is denied;

FURTHER ORDERED that Patent Owner's Motion to Exclude Exhibit 1011 is dismissed as moot;

FURTHER ORDERED that Petitioner's Motion to Exclude Exhibit 2026 is denied;

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

FURTHER ORDERED that Patent Owner's Motion To Seal 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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