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Paper 39
Date: November 1, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

JENAM TECH, LLC,
Patent Owner.

IPR2021-00868
Patent 10,306,026 B1

Before DANIEL J. GALLIGAN, SCOTT B. HOWARD, and JASON M. REPKO, *Administrative Patent Judges.*

GALLIGAN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Dismissing Petitioner's Motion Regarding Estoppel
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, Google LLC ("Petitioner") challenges the patentability of claims 55–57, 59, 60, 64, 66, and 67 of U.S. Patent No. 10,306,026 B1 ("the '026 patent," Ex. 1001), which is assigned to Jenam Tech, LLC ("Patent Owner").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that claims 55–57, 59, 60, 64, 66, and 67 of the '026 patent are unpatentable. *See* 35 U.S.C. § 316(e) (2018) ("In an inter partes review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.").

A. Procedural History

Petitioner challenges the patentability of claims 55–57, 59, 60, 64, 66, and 67 of the '026 patent on the following grounds:

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
55–57, 59, 64, 66	103(a)	Wookey,[2] Berg[3]
60, 67	103(a)	Wookey, Berg, Tucker[4]

[1] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102 and 103 that became effective March 16, 2013. The application for the '026 patent was filed on July 19, 2018. Petitioner asserts that the challenged claims are unpatentable under pre-AIA § 103(a). Pet. 4.
[2] US 2007/0171921 A1, published July 26, 2007 (Ex. 1005).
[3] US 6,674,713 B1, issued Jan. 6, 2004 (Ex. 1007).
[4] US 7,389,512 B2, issued June 17, 2008 (Ex. 1031).

Paper 1 ("Pet.") at 4.[5] Patent Owner filed a Preliminary Response. Paper 7. With our authorization, Petitioner filed a reply to the Preliminary Response (Paper 8) addressing discretionary denial issues, and Patent Owner filed a sur-reply (Paper 9). We instituted trial on the asserted grounds of unpatentability. Paper 11 ("Inst. Dec.") at 21.

During the trial, Patent Owner filed a Response (Paper 17, "PO Resp."), Petitioner filed a Reply (Paper 23, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 29, "PO Sur-reply").

An oral hearing was held on August 10, 2022, a transcript of which appears in the record. Paper 38 ("Tr.").

With our authorization (Paper 35), Petitioner also filed a Motion arguing that Patent Owner is estopped from making certain arguments in this proceeding based on adverse judgment entered against Patent Owner in IPR2021-00629 (Paper 36), and Patent Owner filed an opposition (Paper 37). As explained below, Petitioner has prevailed on the merits of its patentability challenge. Therefore, we dismiss Paper 36 as moot.

B. Related Matters

As required by 37 C.F.R. § 42.8(b)(2), the parties identify various related matters. Pet. 1–2; Paper 5. We are concurrently issuing a Final Written Decision in IPR2021-00867, which involves different claims of the '026 patent.

C. Real Parties in Interest

The parties identify themselves as the real parties in interest. Pet. 1; Paper 5.

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[5] Petitioner challenged claims 52, 55–57, 59–61, 64, and 66–69 (Pet. 3), but Patent Owner disclaimed claims 52, 61, 68, and 69 before institution, leaving only claims 55–57, 59, 60, 64, 66, and 67 (Paper 7 at 1).

D. The '026 Patent and Challenged Claim

The '026 patent states that some transmission control protocol (TCP) implementations support a keep-alive option, but the '026 patent states that "[e]ach node supports or does not support keep-alive for a TCP connection based on each node's requirements without consideration for the other node in the TCP connection." Ex. 1001, 1:54–56, 1:64–67. According to the '026 patent, "[t]o date no mechanism to allow two TCP connection endpoints to cooperate in supporting the keep-alive option has been proposed or implemented." Ex. 1001, 2:25–28. Thus, the '026 patent states that "there exists a need for methods, systems, and computer program products for sharing information for detecting an idle TCP connection." Ex. 1001, 2:32–34.

Claims 55–57, 59, and 60 depend directly or indirectly from disclaimed independent claim 52, and claims 64, 66, and 67 depend directly or indirectly from disclaimed independent claim 61.

Claims 52 and 55 are reproduced below.

> 52. A method comprising:
>
> at a node configured to execute a network application such that the network application operates in accordance with a non-transmission control protocol (TCP) protocol that operates above an Internet Protocol (IP) layer and below a hypertext transfer protocol (HTTP) application layer:
>
> receiving, from another node, a non-TCP packet during a setup of a non-TCP connection;
>
> identifying metadata, that specifies at least one of a number of seconds or minutes, in an idle time period parameter field in the non-TCP packet, for an idle time period, where, as a result of a detection of the idle time period, the non-TCP connection is subject to deactivation; and
>
> determining, based on the metadata, a timeout attribute associated with the non-TCP connection;

> wherein, based on operating in accordance with the TCP protocol, a three-way TCP handshake is performed for establishing a TCP connection that is different than the non-TCP connection.
>
> 55. The method of claim 52 wherein one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period.

II. ANALYSIS

A. Principles of Law

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 ordinary skill in the art; and (4) any secondary considerations, if in evidence.[6] *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

1. Identification of Level of Ordinary Skill

Petitioner argues that a person having ordinary skill in the art "would have an undergraduate degree in electrical engineering, computer engineering, computer science or a related field along with at least two years

[6] Patent Owner does not present any objective evidence of nonobviousness (i.e., secondary considerations) as to any of the challenged claims.

of work experience in the field of networking." Pet. 5 (citing Ex. 1002 ¶¶ 16–18). Petitioner further argues that "[m]ore education can supplement practical experience and vice versa." Pet. 5 (citing Ex. 1002 ¶¶ 16–18).

At institution, we adopted Petitioner's proposed formulation of the level of ordinary skill in the art, except that we omitted the qualifier "at least" to eliminate vagueness as to the amount of practical experience. Inst. Dec. 12.

In its Response, Patent Owner states that it "adopts and applies the Board's formulation for a [person of ordinary skill in the art]." PO Resp. 6.

Based on the complete trial record, we adopt Petitioner's formulation, with the exception of the language "at least," as set forth in the Institution Decision.

2. Patent Owner's Statement Based on the Level of Ordinary Skill

In a footnote, Patent Owner states that "[t]he Board rightfully recognized that Petitioner's articulation improperly encompasses individuals of extraordinary skill in the art" and that "Petitioner's expert testimony was not based on this narrowed formulation." PO Resp. 6 n.4. Patent Owner did not further develop this statement in its brief. *See* PO Resp. We deem such conclusory statements raised only in footnotes and not further developed as forfeited. *See SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006) ("[A]rguments raised in footnotes are not preserved.").

In its Sur-reply, Patent Owner states that Petitioner "relies on a person of extraordinary skill, Dr. Lin, who applied an incorrect and unbounded definition of a POSITA in his expert report," which "renders his opinions unreliable." PO Sur-reply 2–4. However, having forfeited any such argument by not raising it and developing it in the Response, Patent Owner

cannot raise that argument in its Sur-reply. *See* Paper 13, 8 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed [forfeited].") (Scheduling Order); *In re NuVasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (arguments not properly raised in the Patent Owner's Response are forfeited).

Regardless, even if we did consider it, we do not agree with Patent Owner's arguments. We understand Dr. Lin's testimony to be broad enough to encompass anyone within his stated level of ordinary skill in the art. *See* Ex. 1002 ¶ 18 ("My analysis of the '026 patent and my opinions in this declaration are from the perspective of one of ordinary skill in the art, as I have defined it above, at the time of the alleged invention for that patent."). That would include someone who meets the minimum level of skill set forth in his declaration, which is identical to the level of skill we adopted. Thus, although Dr. Lin's testimony encompasses those of more than ordinary skill (in terms of experience), it also addresses someone of ordinary skill. Furthermore, we do not understand Petitioner's and Dr. Lin's position to be that a person of ordinary skill in the art would have had unlimited experience. Rather, we view the use of the language "at least" as imprecise, which is why we omitted it.

C. Claim Construction

We apply the same claim construction standard used in the federal courts. In other words, we apply the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2020). Under the *Phillips* standard, the "words of a claim 'are generally given their ordinary and customary meaning,'" which is "the meaning that the term would have to a

person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1312–13.

1. Keep-Alive Period Based on Idle Time Period

Claims 55 and 64 recite that "one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period." Petitioner does not offer an express construction of the phrase "a keep-alive period that is . . . based on the idle time period" but argues that Berg teaches this by disclosing that a duration of a particular timer "is set to one times that of" a particular value and, therefore, is "based on" that value. Pet. 45–46 (citing Ex. 1007, 20:36–38, 23:46–59; Ex. 1002 ¶ 188). Petitioner cites several passages of the '026 patent in support of its argument that this "understanding is consistent with the '026 patent's disclosure." Pet. 46 (citing Ex. 1001, 14:3–11, 16:43–46, 19:14–15, 22:39–42).

Patent Owner disputes Petitioner's contentions and argues that "[t]he '026 patent only supports the separately recited time periods [(idle time period ("ITP") and keep-alive period ("KAP"))] being different when implemented together as recited in claims 55 and 64." PO Resp. 12 (citing Ex. 1001, 16:43–62, 19:11–23; Ex. 2011 ¶¶ 63–78). Patent Owner argues that "[h]aving the same period for both the keep-alive period and idle time period would cause at least one to be pointless." PO Resp. 13–14. This is because, according to Patent Owner, "[t]hese two periods have distinct purposes and functions. One subjects the connection to deactivation. The other operates to send keep-alive packets." PO Sur-reply 5.

In the Institution Decision, we preliminarily determined that "claims 55 and 64, when interpreted in light of the Specification of the '026

patent, encompass a situation in which the recited 'keep-alive period' is set to one times that of the 'idle time period,' as asserted by Petitioner." Inst. Dec. 9–11. For the reasons explained below, we maintain this determination.

In terms of claim construction, the parties' dispute centers on the language "based on," and we see no reason that this language should be interpreted to exclude setting the KAP to be a one-to-one ratio of the ITP. The Specification of the '026 patent uses the phrase "based on" in multiple places. For example, one passage cited by Patent Owner (PO Resp. 12–13) states the following:

> In another aspect, first node 602 may set a keep-alive timeout attribute *based on* a duration of the first idle time period identified in the first idle information and/or in the metadata provided to second node 604. *For example*, first node 602 may monitor a time period during which no non-empty packets are sent or received in the TCP connection. A keep-alive option handler and/or keep-alive component (not shown) operating in first node 602 may set a keep-alive timer according to the timeout attribute, with a duration that will result in the keep-alive timer expiring before an idle time period can occur.

Ex. 1001, 16:43–53 (emphasis added). In this exemplary disclosure, a keep-alive timer is "based on" an idle time period duration and is set to be less than the idle time period. Patent Owner cites another passage in which a keep-alive timer is set such that a keep-alive packet is sent so as to "prevent detection of an idle time period." Ex. 1001, 19:11–23, *cited in* PO Resp. 13. Although these passages from the Specification of the '026 patent disclose having a keep-alive period that is less than an idle time period, they do not define the phrase "based on," let alone exclude a one-to-one ratio from the scope of "based on."

The following passage from the '026 patent Specification provides more insight on the use of the phrase "based on":

> A duration of time may be identified *based on* the idle information received by ITP policy component in first node 602. A timer may be set according to the identified duration. Detecting the first idle time period may include and/or otherwise may be *based on* detecting the timer expiration. ITP monitor component 556 may set a timer configured to expire in a time duration identified *based on* the first idle information received by ITP policy component 550. The identified duration may be *longer, shorter, or equal to* a duration of the idle time period.

Ex. 1001, 18:30–39 (emphasis added), *cited in* Pet. Reply 9. In the above passage, an identified duration is based on idle information, and an idle time period is detected based on detecting the expiration of a timer that is set according to the identified duration. Importantly, "[t]he identified duration may be *longer, shorter, or equal to* a duration of the idle time period." Ex. 1001, 18:37–39 (emphasis added). Thus, this passage shows that the '026 patent uses the phrase "based on" simply to show some relationship, which would include the situation in which one period is set to be one times (equal to) that of another period.

In its Sur-reply, Patent Owner appears to acknowledge that the phrase "based on" encompasses such a relationship: "Whether the KAP and ITP are set based on different values with different durations does not matter. Nor does it matter if the durations were the same." PO Sur-reply 6. Patent Owner, however, argues that Petitioner "is relying on ***one*** time period (i.e., Berg's client's NSTO) with ***one*** disclosed purpose" while the claims "require ***two different periods*** with ***two different purposes***." PO Sur-reply 7. This argument does not concern the scope of the claims but, rather, Petitioner's contentions as to the teachings of the prior art.

Therefore, we address this argument in our analysis of the asserted grounds of unpatentability below.

In view of the entire trial record, we determine that claims 55 and 64, when interpreted in light of the Specification of the '026 patent, encompass a situation in which the recited "keep-alive period" is set to one times (i.e., a multiplier of 1x) that of the "idle time period."

2. Remaining Terms

For purposes of this Decision, we need not construe expressly any other claim terms. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Obviousness over Wookey and Berg (Claims 55–57, 59, 64, 66)

Petitioner asserts that claims 55–57, 59, 64, and 66 of the '026 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Wookey and Berg. Pet. 12–65. Patent Owner opposes. PO Resp. 15–27; PO Sur-reply 5–25.

1. Wookey

Wookey "generally relates to providing access to computing environments" and discloses an environment in which a client machine can access computing resources provided by various remote machines. Ex. 1005 ¶¶ 2, 135.

2. Berg

Berg relates to packet network communications and discloses negotiating various parameters when using Reliable User Datagram Protocol

(RUDP). Ex. 1007, 17:9–17, 18:56–19:40. Berg discloses that a synchronization (SYN) segment "is used to establish a connection and synchronize sequence numbers between two hosts." Ex. 1007, 18:57–58. The SYN segment contains various negotiable parameters, including a "Null Segment Timeout Value," which specifies "[t]he timeout value for sending a null segment if a data segment has not been sent." Ex. 1007, 18:58–60, 20:37–38.

3. Claim 55

a) Subject Matter of Disclaimed Independent Claim 52

Claim 55 depends from disclaimed independent claim 52, and, therefore, claim 55 incorporates all of the subject matter recited in claim 52. Claim 52 is directed to a method and recites "at a node configured to execute a network application such that the network application operates in accordance with a non-transmission control protocol (TCP) protocol that operates above an Internet Protocol (IP) layer and below a hypertext transfer protocol (HTTP) application layer." Claim 52 then recites certain steps that occur in setting up the non-TCP connection and also recites establishing a TCP connection. Petitioner argues that Wookey discloses that a client machine executes a web browser application to establish connections to remote machines and that these connections can be TCP and non-TCP connections. Pet. 14–19 (citing Ex. 1005 ¶¶ 20, 24, 115, 155, 156, 159, 192–195, 196, 207, 213, 216, 225, 581, 721, 732, 738–739, 744, 751, 754, 757, 772–773, 1134–1136, 1153, Figs. 2C, 3D; Ex. 1002 ¶¶ 110–149).

With respect to the non-TCP connection, claim 52 recites steps that are part of setting up the non-TCP connection. Petitioner argues that, although Wookey discloses using non-TCP protocols, "Wookey does not expressly provide details regarding establishing and maintaining the second

connection or the types of negotiable parameters used to establish the second connection." Pet. 19 (citing Ex. 1002 ¶ 122). Petitioner relies on Berg's disclosures relating to RUDP in combination with Wookey to teach the non-TCP subject matter. Pet. 19–41. Petitioner argues that the RUDP in the combination of Wookey and Berg would have operated between the IP and HTTP layers as taught by Berg's Figure 2, in which RUDP layer 206 is above IP layer 202 and below Signaling Protocols Application(s) layer 208. Pet. 30–33 (citing Ex. 1007, 1:15–59, 5:27–55, 8:3–18, 8:24–31, Fig. 2; Ex. 1002 ¶¶ 143–149).

Petitioner provides various rationales to support the proposed combination of Wookey and Berg. Pet. 24–29. For example, Petitioner argues that a person of ordinary skill in the art would have "recognized the benefits of using the RUDP protocol described in Berg with Wookey's system/method, such as providing client machine 10 with an improved reliable connection to remote machine 30' with the versatility of negotiated timeout parameters consistent with Wookey's desired characteristics for the second connection." Pet. 26.[7] Petitioner also argues that the proposed "combination would have involved using known technologies (e.g., aspects of similar protocols) and design concepts and processes to obtain the foreseeable result of a reliable connection between Wookey's client machine 10 and remote machine 30'." Pet. 27–28 (citing Ex. 1002 ¶ 140).

For the step of "receiving, from another node, a non-TCP packet during a setup of a non-TCP connection," Petitioner argues that Berg discloses that a client initiates a connection by sending a SYN segment to a

[7] The parties use color to denote various claim recitations and prior art teachings and italics to denote the names of prior art references. This use of color and italics has been omitted from quotations in this Decision.

server and that the server sends a SYN response. Pet. 33–34 (citing Ex. 1007, 17:59–18:20, 18:56–62, 19:1–40, 24:40–47; Ex. 1002 ¶¶ 150–153). According to Petitioner, "the responsive SYN segment sent from remote machine 30' and received by client machine 10 in the Wookey-Berg combination is a non-TCP packet." Pet. 34 (citing Ex. 1002 ¶ 152).

For the step of "identifying metadata, that specifies at least one of a number of seconds or minutes, in an idle time period parameter field in the non-TCP packet, for an idle time period, where, as a result of a detection of the idle time period, the non-TCP connection is subject to deactivation," Petitioner argues that Berg discloses that the SYN segment contains negotiable parameters including a null segment timeout value, which, according to Petitioner, teaches the idle time period parameter field. Pet. 34–40 (citing Ex. 1007, 18:27–28, 18:58–60, 19:1–40, 20:36–47, 20:58–64, 21:15–23, 22:20–33, 23:45–24:4, 24:15–25, 24:39–48; Ex. 1002 ¶¶ 154–172).

Petitioner argues that Berg's "null segment timeout value ('metadata') indicates the amount of time that a client will wait ('idle time period') before sending a null segment when the connection has been idle (e.g., when a data segment has not been sent or received)" and, therefore, "represents an 'idle time period,' as claimed." Pet. 37–38 (citing Ex. 1007, 20:36–41, 22:25–33; Ex. 1002 ¶ 164). Petitioner contends that, "if the null segment is not received or acknowledged, the connection is subject to being closed via an 'auto reset.'" Pet. 39 (citing Ex. 1007, 23:45–49; Ex. 1002 ¶ 166). According to Petitioner, "[w]hen an auto-reset occurs at the client side, the client will send a reset (RST) segment to the server to close or reset the connection." Pet. 39 (citing Ex. 1007, 18:27–28, 22:20–24, 23:60–24:4); *see*

also Ex. 1007, 22:20 ("The RST segment is used to close or reset a connection.").

For the step of "determining, based on the metadata, a timeout attribute associated with the non-TCP connection," Petitioner argues that Berg's disclosure of configuring and enabling the null segment timer based on the null segment timeout value teaches this subject matter. Pet. 40–41 (citing Ex. 1007, 23:58–59; Ex. 1002 ¶¶ 173–178); *see also* Pet. 50 (setting forth contentions based on Berg's "transfer state timeout value").

With respect to the TCP connection, claim 52 recites "wherein, based on operating in accordance with the TCP protocol, a three-way TCP handshake is performed for establishing a TCP connection that is different than the non-TCP connection." Petitioner argues that "[a] three-way handshake is necessarily performed to establish a TCP connection" because the TCP specification (RFC 793) requires a three-way handshake to establish a TCP connection. Pet. 42–43 (citing Ex. 1002 ¶¶ 180–181; Ex. 1008 (RFC 793), 31–32, 34–37); *see also* Ex. 1008, 34 ("The 'three-way handshake' is the procedure used to establish a connection."), 32 ("A three way handshake is necessary because sequence numbers are not tied to a global clock in the network, and TCPs may have different mechanisms for picking the ISN's.").

As noted above, Patent Owner disclaimed independent claim 52, and Patent Owner does not specifically dispute Petitioner's contentions for claim 52, apart from some arguments as to claim 55 that address language in claim 52, such as "subject to deactivation" and "metadata." We address these issues below.

b) Additional Subject Matter in Claim 55

Claim 55 recites, "The method of claim 52 wherein one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period."

Petitioner argues that Berg "discloses that the client will send a null segment ('one or more keep-alive packets') to the server when its null segment timer expires" and that "[t]he duration ('keep-alive period') for the null segment timer is set proportionally to the identified null segment timeout value (metadata specifying the 'idle time period')." Pet. 45 (citing Ex. 1007, 20:36–41, 23:45–49). "For example," Petitioner argues, "the duration of null segment timer for the client is set to one times that of the identified null segment timeout value—i.e., the null segment timer's duration mirrors the 'idle time period' specified by the identified null segment timeout value." Pet. 45–46 (citing Ex. 1007, 20:36–38, 23:46–59; Ex. 1002 ¶ 188).

As discussed above in § II.C.1, claim 55 encompasses a keep-alive period that is set to one times that of the idle time period. Patent Owner, however, argues that Petitioner's contentions are deficient because "[t]he claims recite two different time periods serving different purposes" but Petitioner "is relying on ***one*** time period to satisfy" both claimed periods. PO Resp. 13, 17. Patent Owner contends that the ITP and the KAP "have distinct purposes and functions. One subjects the connection to deactivation. The other operates to send keep-alive packets." PO Sur-reply 5. According to Patent Owner, "[u]sing the same time period for the keep-alive and idle time periods defeats the purpose of having a keep-alive mechanism." PO Resp. 25. Patent Owner further argues that "Berg's connection is ***not*** 'subject to deactivation' because 'keep alive' packets are being sent."

PO Sur-reply 12. According to Patent Owner, therefore, Petitioner's contentions "would improperly eviscerate the 'deactivation' requirement of the claims rendering the phrase meaningless and having no effect." PO Sur-reply 12.

Patent Owner's arguments are based on a misreading of the claims. There is no requirement in the challenged claims that the connection actually be deactivated. The relevant language in claim 52 is "identifying metadata, that specifies at least one of a number of seconds or minutes, in an idle time period parameter field in the non-TCP packet, for an idle time period, where, as a result of a detection of the idle time period, *the non-TCP connection is subject to deactivation*" (emphasis added). Claim 54, which depends from claim 52 but is not challenged here, affirmatively recites "deactivating the non-TCP connection." No such requirement exists in the challenged claims.

We agree with Petitioner that, in Berg, the node will wait for the amount of time that is the negotiated null segment timeout value, which corresponds to the claimed "idle time period." *See* Pet. 37–38 (citing Ex. 1007, 18:58–60, 19:22–25, 20:36–42, 22:25–33). With respect to the null segment timer, Berg explains that "[t]he client maintains a timer which started when the connection is opened and is reset every time a data segment is sent." Ex. 1007, 23:45–48, *cited in* Pet. 38. Thus, the null segment timeout value in Berg represents a period of idleness in the connection in which nothing has been sent from the client. Ex. 1007, 23:45–48. Berg explains that, "[i]f the client's null segment timer expires, the client will send a null segment to the server." Ex. 1007, 23:48–49, *cited in* Pet. 38. At that point, the connection in Berg is subject to deactivation, which is why Berg discloses sending a keep-alive packet in the form of a null segment. If the connection were not subject to deactivation, there would be no need for a

keep-alive packet. Thus, Patent Owner's argument that "Berg's connection is ***not*** 'subject to deactivation' because 'keep alive' packets are being sent" (PO Sur-reply 12) shows the opposite. In particular, the fact that keep-alive packets are being sent shows that the connection may be deactivated without them, i.e., "subject to deactivation."

As to Patent Owner's argument that the claim requires two periods having distinct purposes and functions (PO Sur-reply 5), we find that Berg teaches such periods, as asserted by Petitioner. As discussed in the preceding paragraph, Berg's null segment timeout value represents a period of idleness in the connection in which nothing has been sent from the client, at which point the connection is subject to deactivation. Ex. 1007, 23:45–48. Thus, the negotiated null segment timeout value represents a period of idleness that is "an idle time period, where, as a result of a detection of the idle time period, the non-TCP connection is subject to deactivation." Separately, "the duration of null segment timer for the client is set to one times that of the identified null segment timeout value." *See* Pet. 45–46 (citing Ex. 1007, 20:36–38, 23:46–59). Berg discloses sending a keep-alive packet in the form of a null segment when the null segment timer expires. Ex. 1007, 23:45–49. Thus, Berg teaches that a keep-alive packet is communicated, based on a keep-alive period that is, in turn, based on the idle time period. Berg's keep-alive period at the client side is set to one times the negotiated null segment timeout value, which is within the scope of the claim as discussed above in § II.C.1. Thus, we are persuaded that Berg teaches two periods having "distinct purposes and functions." *See* PO Sur-reply 5. One period represents a period of idleness and subjects the connection to deactivation. The other period, which is based on the idle period because it is set at one times that period, is for sending a keep-alive

packet. Claim 52 is met with the sending of one keep-alive packet, and there is no requirement in the challenged claims that the connection be deactivated. Thus, we find that Berg teaches that "one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period."

Patent Owner also argues that a person of ordinary skill in the art "would ***not*** have been motivated to modify Berg as Petitioner proposes, much less combine it with Wookey in such a way, and certainly not had any expectation of success" because "[u]sing the same time period for the keep-alive and idle time periods defeats the purpose of having a keep-alive mechanism." PO Resp. 25. Petitioner, however, is not relying on a modification of Berg; rather Petitioner relies on Berg's express disclosures of sending a keep-alive (null segment) as part of the RUDP protocol, which Petitioner asserts is a "non-TCP" protocol that would have been combined with Wookey. *See* Pet. 19–23 (discussing Berg's RUDP teachings), 24–29 (discussing combination of Wookey and Berg), 45–46 (addressing claim 55). Patent Owner does not specifically address Petitioner's reasons for combining Wookey and Berg (*see* PO Resp. 25–27), and we find Petitioner's reasons, which we summarize in the preceding section, persuasive.

Patent Owner also argues that Petitioner's arguments in other proceedings show that a person of ordinary skill in the art "would not have been motivated to use [Petitioner]'s undisclosed ITP that subjects the connection to deactivation and a separate KAP where both were set to the same duration." PO Sur-reply 15–16 (citing IPR2021-00627, Paper 1 at 62); *see also* PO Resp. 5 ("[I]n related proceedings, Petitioner has argued that a [person of ordinary skill in the art] would have been motivated to use different periods for a keep-alive period and idle time period." (citing

arguments in IPR2021-00867, IPR2020-00845, and IPR2021-00627)). In particular, Patent Owner cites Petitioner's arguments in IPR2021-00627 as allegedly showing that Petitioner "admits that a [person of ordinary skill in the art] would not have used the same time period for Berg's alleged ITP (which is not disclosed) and alleged KAP." PO Sur-reply 15–16 (quoting IPR2021-00627, Paper 1 at 62; IPR2021-00627, Ex. 1002 ¶ 228). These cases did not involve Berg; rather, they involved a different reference, Eggert (IETF publication titled "TCP Abort Timeout Option"), which Petitioner relied on to show differently-recited "idle time period[s]." *See* IPR2021-00627, Paper 1 at 3 (ground based on Wookey (US 2007/0171921 A1) and Eggert); IPR2021-00627, Ex. 1001, claim 1 ("identify metadata in the idle time period parameter field for an idle time period, during which, no packet is communicated in a TCP-variant connection to keep the TCP-variant connection active"); IPR2021-00845, Paper 3 at 11 (ground based on Eggert); IPR2021-00845, Ex. 1001, claims 1 ("identifying metadata in the idle time period parameter field for an idle time period and, during which, no packet is communicated in the TCP-variant connection to keep the TCP-variant connection active"), 15 ("receiving idle information for detecting an idle time period, during which, no packet is communicated in a transmission control protocol (TCP)-variant connection to keep the TCP-variant connection active"); IPR2021-00867, Paper 1 at 4 (ground based on Eggert); IPR2021-00867, Ex. 1001, claims 1 ("identifying metadata in the idle time period parameter field for an idle time period and, during which, no packet is communicated in the TCP-variant connection to keep the TCP-variant connection active"), 33 ("receiving idle information for detecting an idle time period, during which, no packet is communicated in a transmission control protocol (TCP)-variant connection to keep the

TCP-variant connection active"). Thus, Petitioner's arguments in those proceedings relate to different prior art and claim language and are not inconsistent with its arguments here.

But, inasmuch as Patent Owner asks that we "take official notice of these related proceedings and [Petitioner]'s contradictory theories" (PO Sur-reply 15), our conclusions in these cases show that it also would have been obvious to use a keep-alive period that is shorter than an ITP, as Patent Owner suggests is required here. *See, e.g.*, IPR2021-00627, Paper 39 (Final Written Decision) at 41–42 (conclusions as to claim 4 of US Patent 10,375,215 B1, reciting in relevant part "one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period"); IPR2021-00867, Paper 37 (Final Written Decision) at 29–35 (conclusions as to claims 17 and 43 of US Patent 10,306,026 B1, reciting in relevant part "one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period"); PO Sur-reply 15–16 (asserting that setting a keep-alive period based on a longer timeout period "is dictated by common sense").

Patent Owner also argues that Petitioner's contentions fail because Petitioner relies on Berg's null segment timeout value for "the separately claimed 'metadata' and 'idle information.'" PO Sur-reply 10. We do not agree with this argument. The metadata in claim 52 specifies an amount of time in an idle time period parameter field for an ITP. Petitioner contends that the negotiated null segment timeout value in Berg's SYN segment specifies the number of seconds in the ITP. Pet. 34–35. We agree because Berg discloses that the null segment timeout value is specified in milliseconds and is a negotiable parameter that is sent as part of the SYN segment. Ex. 1007, 20:36–41. Patent Owner's argument suggests that the

metadata need to be different from the idle time period, but we disagree because, in that case, the metadata would not "specif[y] at least one of a number of seconds or minutes" for an ITP, as recited in claim 52. We agree with Petitioner's identification of "metadata" in Berg.

c) Claim 55 Conclusion

Based on Petitioner's persuasive contentions and evidence, summarized and addressed above, we find that the combination of Wookey and Berg teaches the subject matter of claim 55 and that a person of ordinary skill in the art would have had reason to combine the teachings of Wookey and Berg in the manner asserted.

For the reasons discussed above and based on the full trial record, Petitioner has demonstrated by a preponderance of the evidence claim 55 would have been obvious based on the combination of Wookey and Berg.

4. Claim 56

Claim 56 recites, "The method of claim 55 wherein the keep-alive period is not configurable, while the idle time period is configurable." Petitioner argues that, in Berg, the null segment timeout value, which specifies the "idle time period," is negotiable during setup whereas "the client's null segment timer's duration is set to the period specified by the null segment timeout value once the connection is established." Pet. 47–48. Thus, according to Petitioner, the client's null segment timer's duration "is not configurable by the client as the fixed proportion itself is not configurable during the connection setup." Pet. 48.

Patent Owner argues that Petitioner relies on the same period in Berg for the ITP and the KAP and therefore that Petitioner cannot argue one is configurable and the other is not configurable. PO Resp. 21–25. We have addressed this argument in the context of claim 55, and we reject it because,

as explained above, Petitioner relies on a fixed ratio wherein the KAP is set to one times that of the ITP in Berg. Thus, the fixed ratio of one-to-one is not configurable in that it is not subject to negotiation, as opposed to the underlying null segment timeout value, which is negotiated.[8] Patent Owner confirmed during oral argument that "not configurable means not subject to negotiation." Tr. 31:12–14.[9]

Based on Petitioner's persuasive contentions and evidence, we conclude that claim 56 would have been obvious based on the combination of Wookey and Berg.

5. Claim 57

Claim 57 recites, "The method of claim 55 wherein the one or more keep-alive packets are conditionally communicated based on at least one keep-alive attribute." Petitioner contends that the asserted combination teaches this subject matter because "a null segment ('keep-alive packet') is conditionally communicated based on the expiration of the client machine 10's null segment timer ('keep-alive attribute')." Pet. 49 (citing Ex. 1007, 23:45–49; Ex. 1002 ¶¶ 196–197; Ex. 1011, 13–14). Patent Owner does not dispute Petitioner's contentions for claim 57. *See* PO Resp.

Based on Petitioner's persuasive contentions and evidence, we conclude that claim 57 would have been obvious based on the combination of Wookey and Berg.

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[8] In its analysis of claim 61, Petitioner explains that Berg's server maintains a null segment timer with a time-out value of twice the client's time-out value, further underscoring the fixed nature of the ratios disclosed in Berg. Pet. 57 (citing Ex. 1007, 23:51–52).

[9] Because the parties agree that not configurable means not subject to negotiation, we need not resolve any disputes as to the scope of the negative limitation. *See Realtime Data*, 912 F.3d at 1375.

6. Claim 59

Claim 59 recites, "The method of claim 55 wherein the node determines, based on the metadata, the timeout attribute associated with the non-TCP connection, in connection with negotiating, with the another node, a duration of the idle time period." As discussed above for claim 52, Berg discloses a "timeout attribute" as whether the null segment mechanism is enabled. Pet. 40. For claim 59, Petitioner argues that this attribute is determined in connection with the negotiation of the ITP. Pet. 50 (citing Ex. 1002 ¶¶ 198–199). Patent Owner does not dispute Petitioner's contentions for claim 59. *See* PO Resp.

Based on Petitioner's persuasive contentions and evidence, we conclude that claim 59 would have been obvious based on the combination of Wookey and Berg.

7. Claims 64 and 66

Claim 64 depends from disclaimed independent claim 61, and claim 66 depends from claim 64. Petitioner explains how the combination of Wookey and Berg teaches the subject matter of claim 61, referring to similar recitations in claim 52 where appropriate. Pet. 50–58.

More specifically, claim 61 recites "[a] method comprising: at a node configured to execute a network application such that the network application is operates in accordance with a non-transmission control protocol (TCP) protocol that operates above an Internet Protocol (IP) layer and below a hypertext transfer protocol (HTTP) application layer." Petitioner refers to its contentions for a similar recitation in claim 52. Pet. 51.

Claim 61 recites "receiving idle information for use in detecting an idle time period that results in a non-TCP connection being subject to

deactivation." Petitioner argues that a client in Berg receives a SYN packet with negotiable parameters such as a null segment timeout value, similar to its contentions for claim 52. Pet. 51–54.

Claim 61 recites "generating, based on the idle information, a non-TCP packet including an idle time period parameter field identifying metadata that is specified in at least one of a number of seconds or minutes." Petitioner argues that Berg's disclosures of the RUDP setup negotiation teach this subject matter because the client can propose a timeout value when initiating a connection and can accept or negotiate a timeout value when it receives a SYN segment from a server. Pet. 54–56.

Claim 61 recites "sending, from the node to another node and for establishing the non-TCP connection, the non-TCP packet to provide the metadata to the another node, for use by the another node in determining a timeout attribute associated with the non-TCP connection." Petitioner refers to Berg's disclosures of exchanging data during setup to negotiate a timeout value. Pet. 56–58.

Claim 61 recites "wherein a three-way TCP handshake is performed for establishing a TCP connection that is separate from the non-TCP connection." Petitioner refers to its contentions for similarly-recited subject matter in claim 52. Pet. 58.

Claim 64 recites,

> The method of claim 61 wherein: one or more keep-alive packets are communicated, based on a keep-alive period that is, in turn, based on the idle time period; the keep-alive period is not configurable, while the idle time period is configurable; and the one or more keep-alive packets are conditionally communicated based on at least one keep-alive attribute.

Thus, the additional subject matter recited in claim 64 corresponds to the subject matter in claims 55–57, and Petitioner refers to its contentions for these claims. Pet. 58–59.

Claim 66 recites, "The method of claim 64 and further comprising: configuring the node to cause the another node to determine, based on the metadata, the timeout attribute associated with the non-TCP connection, in connection with negotiating, with the node, a duration of the idle time period." Petitioner refers to its contentions for claims 59 and 64. Pet. 59.

Patent Owner asserts the same arguments against claims 64 and 66 that we discuss for claims 55 and 56 and does not raise additional arguments. *See* PO Resp. 15–27.

Based on Petitioner's persuasive contentions and evidence and for the reasons discussed above in §§ II.D.3–4, we conclude that claims 64 and 66 would have been obvious based on the combination of Wookey and Berg.

E. Obviousness over Wookey, Berg, and Tucker (Claims 60, 67)

Claim 60, which depends from claim 55, and claim 67, which depends from claim 64, recite "wherein a duration of the idle time period is configured by an application via an analog of a socket."

Petitioner asserts that claims 60 and 67 would have been obvious based on the combination of Wookey, Berg, and Tucker, building on its contentions for claims 55 and 64, discussed above in §§ II.D.3 and II.D.7. Pet. 66–74. Petitioner argues that a person of ordinary skill in the art would have understood that Berg's null segment timeout value is configured (negotiated) by a node's "application via an interface operating between the application and the RUDP protocol" and that "[a]n inter-process communication ('IPC') would be used to provide the interface between the

application/user and the RUDP protocol." Pet. 66–67 (citing Ex. 1002 ¶¶ 254–255). Petitioner argues that Tucker teaches common IPCs, including a shared memory, a message queue, a pipe, a stream, and a socket. Pet. 68 (citing Ex. 1031, 2:36–39, 3:11–15, 3:36–43, 3:45–50, 8:52–56, 9:37–45, 10:24–31, Fig. 2A; Ex. 1002 ¶ 259). According to Petitioner, "Tucker explains that a socket can be interchanged with other IPC components such as a shared memory segment, a message queue, a pipe, or a stream for establishing an IPC." Pet. 69 (citing Ex. 1031, 13:55–65). Petitioner argues that each of these other IPC components (shared memory segment, message queue, pipe, stream) is an analog of a socket for providing inter-process communication. Pet. 69 (citing Ex. 1002 ¶¶ 261–262). Petitioner provides various reasons to show that it would have been obvious to a person of ordinary skill in the art

> to configure and implement the interface between the RUDP protocol and the application/user at the client machine 10 in the Wookey-Berg combination to use an IPC component, such as a shared memory segment, a message queue, a pipe, or a stream (each disclosing "an analog of a socket") to enable the application to configure the null segment timeout value ("the duration of the idle time period") for the RUDP connection between the application and the RUDP protocol.

Pet. 70–73 (citing Ex. 1002 ¶¶ 264–272). Patent Owner does not present additional arguments regarding Petitioner's contentions for these claims. *See* PO Resp. 27 (arguing only that Tucker does not cure the alleged deficiencies Patent Owner argues for claims 55 and 64).

Petitioner's contentions are persuasive, and we conclude that the subject matter recited in claims 60 and 67 would have been obvious based on the combinations of Wookey, Berg, and Tucker.

F. Constitutional Challenge

Patent Owner argues that the Director's delegation of the institution decision to the Board violates the Constitution. PO Resp. 27–30. Specifically, Patent Owner argues that, because "PTAB decisions must be controlled by a principal officer, the current IPR process violates the Constitution" as the Director does not review institution decisions. PO Resp. 30–33 (citing *United States v. Arthrex, Inc.*, 141 S. Ct. 1970, 1982 (2021)). Patent Owner further argues that the PTAB has a structural bias that "violates Constitutional Due Process." PO Resp. 31–38.

Petitioner responds that "the Federal Circuit in *Mobility Workx, LLC v. Unified Pats., LLC* 'declined to find that the IPR process violates Due Process on [the] basis' [Patent Owner] advocates (Response, 38). 15 F.4th 1146, 1157 (Fed. Cir. 2021). Thus, precedent precludes [Patent Owner]'s argument." Pet. Reply 27 (first alteration in original).

We agree with Petitioner that the Federal Circuit has rejected the same arguments that Patent Owner makes here. *See Mobility Workx*, 15 F.4th at 1150–57; *see also In re Palo Alto Networks, Inc.*, 44 F.4th 1369, 1379 (Fed. Cir. 2022) ("We conclude that the delegation of authority as to whether to institute IPR and PGR proceedings to the Board and the Director's policy refusing to accept party requests for Director rehearing of decisions not to institute do not violate the Appointments Clause.").

G. Patent Owner's Sur-reply Arguments

Petitioner argues that some of the arguments in the Sur-reply are improper. Paper 30. Patent Owner responds that its arguments either were made in the Patent Owner Response or are responsive to new arguments in the Reply. Paper 31.

Because we find that the challenged claims are unpatentable even if we consider Patent Owner's arguments, we need not address whether any of the arguments in the Sur-reply are improper.

III. CONCLUSION[10]

For the reasons discussed above, we determine that Petitioner has proven, by a preponderance of the evidence, that claims 55–57, 59, 60, 64, 66, and 67 are unpatentable, as summarized in the following table:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
55–57, 59, 64, 66	103(a)	Wookey, Berg	55–57, 59, 64, 66	
60, 67	103(a)	Wookey, Berg, Tucker	60, 67	
Overall Outcome			55–57, 59, 60, 64, 66, 67	

[10] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

IV. ORDER

Accordingly, it is

ORDERED that claims 55–57, 59, 60, 64, 66, and 67 of the '026 patent have been shown to be unpatentable;

FURTHER ORDERED that Petitioner's Motion Regarding Estoppel is dismissed; 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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