

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PALO ALTO NETWORKS, INC., FORTINET, INC., and
WATCHGUARD TECHNOLOGIES, INC.
Petitioner,

v.

SELECTIVE SIGNALS, LLC,
Patent Owner.

Case IPR2018-00594
Patent 8,111,629 B2

Before KRISTEN L. DROESCH, CHRISTOPHER M. KAISER, and
MELISSA A. HAAPALA, *Administrative Patent Judges*.

DROESCH, *Administrative Patent Judge*.

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

DECISION DENYING MOTION TO AMEND
§ 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine Petitioner establishes, by the preponderance of the evidence, that claims 15 and 17–22 (“challenged claims”) of U.S. Patent No. 8,111,629 B1 (Ex. 1001, “’629 Patent”) are unpatentable. Based on the entirety of record before us, we also determine Petitioner establishes, by the preponderance of the evidence, that proposed substitute claims 25–29 presented in the Motion to Amend are unpatentable.

A. Procedural History

Palo Alto Networks, Inc., Fortinet, Inc., and WatchGuard Technologies, Inc. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 15 and 17–22 of the ’629 Patent. Paper 1 (“Pet.”). Selective Signals, LLC (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). Pursuant to 35 U.S.C. § 314, we instituted trial on August 9, 2018, as to all of the challenged claims of the ’629 Patent (Paper 13, “Institution Decision” or “Dec.”).

After institution of trial, Patent Owner filed a Response (Paper 20, “PO Resp.”), to which Petitioner filed a Reply (Paper 25, “Reply”), to which Patent Owner filed a Sur-Reply (Paper 29, “Sur-Reply”).

Patent Owner also filed a Motion to Amend (Paper 19, “Mot. Amend”), to which Petitioner filed an Opposition (Paper 26, “Opp. Mot. Amend”), to which Patent Owner filed a Reply (Paper 30, “Reply Opp. Mot. Amend”), and to which Petitioner filed a Sur-Reply (Paper 40, “Sur-Reply Opp. Mot. Amend”).

Petitioner relies on a Declaration of Dr. Samuel H. Russ (Ex. 1003) to support its Petition. Patent Owner relies on a Declaration of Dr. Gabi Nakibly (Ex. 2001) to support its Patent Owner Response. Dr. Russ was cross-examined during trial, and a transcript (Ex. 2005) of the deposition is included in the record. Petitioner also relies on a Supplemental Declaration of Dr. Russ (Ex. 1011) to support its Reply and Opposition to the Motion to Amend.

Petitioner filed a Motion to Exclude Exhibits 2006, 2007, 2009, 2011, 2012, 2014, 2016, and 2017 (Paper 35, “Mot. Excl.”), to which Patent Owner filed an Opposition (Paper 38, “Opp. Mot. Excl.”), and to which Petitioner filed a Reply (Paper 39, “Reply Opp. Mot. Excl.”).

Petitioner also filed a Notice of Improper Argument and Evidence (Paper 34, “Notice”), to which Patent Owner filed a Response (Paper 42, “Resp. Notice”).

Oral argument was held on May 7, 2019. A transcript of the oral argument is included in the record. Paper 45 (“Tr.”).

B. Related Proceedings

The ’629 Patent is involved in *Selective Signals, LLC v. Palo Alto Networks, Inc.*, 6:17-cv-00065 (E.D. Tex. 2017) (now pending in D. Del. as Case No. 1:17-cv-01470); *Selective Signals, LLC., v. Fortinet, Inc.*, 6:17-cv-00064 (E.D. Tex. 2017) (now pending in N.D. Cal. as Case No. 4:18-cv-00222); *Selective Signals, LLC., v. WatchGuard Technologies, Inc.*, 6:17-cv-00067 (E.D. Tex. 2017) (now pending in W.D. Was. as Case No. 2:17-cv-01823); and *Selective Signals, LLC v. Rohde & Schwarz USA, Inc.*, 6:17-cv-00066 (E.D. Tex. 2017) (dismissed with prejudice). Pet. 5; Paper 7, 2.

C. The '629 Patent

The '629 Patent, titled “Media Session Identification Method for IP Networks,” issued February 7, 2012, from U.S. Patent Application No. 12/513,510 (“’510 Application”). Ex. 1001, [54], [45], [21]. The '629 Patent relates to “a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions.” *Id.* at 1:19–22.

According to the '629 Patent, “traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis,” in which “[p]ackets whose headers indicate the same destination may be assumed to belong to the same session,” but it is too “simplistic.” Ex. 1001, 2:4–9. “[T]here is also the so called ‘Deep Packet Inspection’ method, or the ‘Packet Content Analysis’” method, which “is depend[en]t on elements that can be encrypted or altered by the application and can therefore be initially unreadable or the reading can become invalid if the application alters its content sequence.” *Id.* at 2:9–36. “[I]t is also known to use Complete Packet Inspection (CPI), which combines header analysis and deep packet inspection,” but doing so “requires strong powerful monitoring processing power as well as huge memory resources, as many thousands of IP sessions occur simultaneously,” which “renders the solution unfeasible in many cases.” *Id.* at 2:38–54.

To overcome these limitations, the '629 Patent describes “us[ing] the regularity and similarity characteristics of packet traffic, belonging to a media session, to identify the packets belonging to a given media session” and to subsequently identify the kind of media session, “so that the media session can be provisioned and/or controlled (e.g allocating appropriate

resources or not allocating at all, as required).” Ex. 1001, 3:23–29.

According to the ’629 Patent,

[t]raffic characteristics relate to those parameters inherent to packets traffic flow as it travels from source to destination and includes features such as packet length, inter-arrival period, bandwidth and statistical and other derivations thereof *as well as certain header characteristics such as source address and destination address* but excludes packet payload content whose inspection is common in deep packet inspection (packet content inspection) techniques.

Id. at 6:11–19 (emphasis added).

Figure 1 is reproduced below.

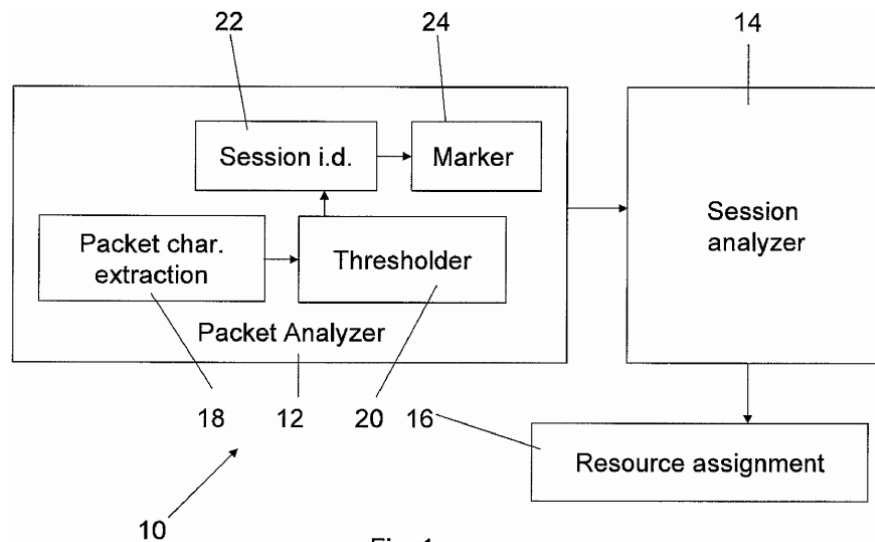


Fig. 1

Figure 1 is a simplified block diagram showing a packet and session identification apparatus according to a first embodiment. *See* Ex. 1001, 5:57–59. “Apparatus 10 comprises a packet analyzer unit 12 and a session analyzer unit 14.” *Id.* at 6:36–37. Resource assignment unit 16 assigns, limits, or refuses network resources to the identified media session “so that individual packets are given a priority level according to the needs of the media session to which they are found to belong, or may provide other provisioning or control actions for the session.” *Id.* at 6:37–42.

The packet analyzer 12 analyzes incoming data packets and determines which packets belong to a common session. The packet analyzer 12 includes a packet characteristic extractor 18 which extracts readily available packet traffic characteristics such as packet length or inter-arrival period, *or source or destination addresses or other traffic characteristics of the packets*. Readily available characteristics are those characteristics that do not require deep analysis of the packet content. Preferably, characteristics that can be obtained from mere observable traffic behavior examination, without opening the packet, are used. The packet characteristic extraction unit obtains these packet characteristics from a succession of packets.

Id. at 6:43–55 (emphasis added). Thresholder 20, connected to packet traffic characteristic extractor 18, sets up thresholds based on the characteristics found by packet characteristic extractor 18. *See id.* at 6:56–58.

“[T]hresholding for length or inter-arrival period or even better for both, allows for packets to be assigned to a common session with relatively high probability.” *Id.* at 6:61–64. Packet session identifier 22 uses the thresholds to identify packets whose characteristics are mutually within the thresholds as belonging to a common session. *See id.* at 6:64–67. Packet marker 24 inserts an indication of the common session with which a given packet has been identified into its header. *See id.* at 7:2–4. Packets believed to belong to the same session can be grouped together so that the session itself can be analyzed. *See id.* at 7:4–6.

Session analyzer 14 analyzes grouped together packets to obtain characteristics that could provide important information about the session type and requirements. *See Ex. 1001, 7:9–11.* “The session analyzer may use the packet’s traffic characteristics, such as packet length and/or inter-arrival period to indicate the session type.” *Id.* at 7:26–28.

D. Illustrative Claim

Of the challenged claims, claim 15 is independent and claims 17–22 depend directly from claim 15. Independent claim 15 is illustrative of the challenged claims and is reproduced below:

15. A method of identifying session type, comprising
 - obtaining passing packets of respectively unknown sessions and unknown session types;
 - obtaining traffic packet characteristics of said passing packets of respectively unknown session types;
 - comparing said obtained packets with each other using respectively obtained traffic packet characteristics;
 - grouping together those packets having similar values of said traffic packet characteristics into a presumed session; and
 - analyzing said grouped packets of said presumed session for session characteristic;
 - using said session characteristics to identify a session type of said presumed session.

Ex. 1001, 13:26–39.

E. Asserted Grounds of Unpatentability and Prior Art

Petitioner asserts the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over Pappu¹ alone, or in combination with Peleg². *See* Pet. 26–27.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, a claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent

¹ Ex. 1004, US 8,085,775 B1, issued Dec. 27, 2011 (“Pappu”).

² Ex. 1006, US 2006/0262789 A1, published Nov. 23, 2006 (“Peleg”).

in which it appears. 37 C.F.R. § 42.100(b) (2018).³ Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). “[T]he ordinary and customary meaning of a claim term 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 v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) (citing *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d, 1111, 1116 (Fed. Cir. 2004)). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner does not propose explicit constructions for any terms. Pet. 20–21. Patent Owner presents arguments addressing the constructions for “traffic packet characteristics” and “session,” which Petitioner disputes. *See* PO Resp. 11–16, 21–23; Reply 1–5, 11–15; Sur-Reply 1–6, 11–16. We address below the parties arguments.

³ A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

1. *“Traffic Packet Characteristics” (Claim 15)*

In the Preliminary Response, Patent Owner proposed that “traffic packet characteristics” should be construed as “parameters associated with a traffic packet, the parameters including more than packet header information and excluding packet payload content whose inspection is common in deep packet inspection techniques.” Prelim. Resp. 6–16; PO Resp. 11–16 (repeating argument). In the Institution Decision, the panel “decline[d] to construe ‘traffic packet characteristics’ to require more than packet header information,” and instead “construe[d] ‘traffic packet characteristics’ to encompass characteristics derived exclusively from header information.” Dec. 8–9.

Patent Owner argues that the ’629 Patent “explicitly discounts the use of (and therefore teaches away from) relying only on packet header information.” PO Resp. 11–12 (quoting Ex. 1001, 2:4–11); *see* Prelim Resp. 7 (same argument). Patent Owner contends the ’629 Patent teaches the use of “more than packet header information,” such as packet length and inter-arrival period, which “are not found in the packet header.” PO Resp. 12–13 (citing Ex. 1001, 6:8–22; Ex. 2001 ¶¶ 36, 43); Prelim. Resp. 7–8 (same argument). According to Patent Owner’s witness, Dr. Nakibly,

[a]lthough there is a field in the packet’s IP header that denotes the packet’s length, this field only refers to the length of the IP header and its payload. It does not include the sum of lengths of other headers and trailers of layer 2 the packet may have.

Ex. 2001 ¶ 36. Patent Owner also relies on the ’629 Patent disclosure that “[t]raffic characteristics . . . include[] features such as packet length . . . *as well as* certain header characteristics such as source address and destination address,” by interpreting “as well as” to permit “certain header

characteristics” but to require “features such as packet length, inter-arrival period, bandwidth and statistical and other derivations thereof.” PO Resp. 15 (quoting Ex. 1001, 6:8–19); *see* Prelim. Resp. 10 (same argument).

In reply, Petitioner asserts that Patent Owner’s Response repeats arguments from the Preliminary Response, and did not respond to the Board’s reasons in the Institution Decision for rejecting Patent Owner’s claim construction. *See* Reply 3–5 (citing Dec. 8–9). Patent Owner disputes Petitioner’s assessment of the Response, contending that Patent Owner did respond to the Institution Decision and did address the Board’s claim construction. *See* Sur-Reply 7. Patent Owner also provides new arguments and evidence in the Sur-Reply to address the claim construction of “traffic packet characteristics” in the Institution Decision. *See id.* at 3–7 (citing Ex. 2011).

We agree with Petitioner’s characterization of the Response because Patent Owner’s arguments are, indeed, nearly identical to those of the Preliminary Response. *Compare* PO Resp. 11–16 *with*, Prelim. Resp. 6–11. Patent Owner’s arguments responsive to the Institution Decision, presented for the first time in the Sur-Reply, are belated. As explained in the Trial Practice Guide Update (“TPG Update”), “[g]enerally, a . . . sur-reply may only respond to arguments in the preceding brief.” 83 Fed. Reg. 39,989, <https://go.usa.gov/xU7GP> at 15 (Aug. 2018) (citing 37 C.F.R. § 42.23). “The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness. Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony.” *Id.* at 14. Patent Owner does not present any reason why these arguments could not have been presented in the Patent Owner Response. Accordingly, we do

not consider Patent Owner’s belated Sur-Reply arguments and evidence responsive to the claim construction of “traffic packet characteristics in the Institution Decision.”⁴

As explained in the Institution Decision, we decline to construe “traffic packet characteristics” to require more than packet header information. Although the ’629 Patent identifies packet header analysis as traditional technology (*see* Ex. 1001, 2:4–7) that is “simplistic” (*id.* at 2:9), it characterizes packet header analysis as focusing on destination (*id.* at 2:7–8 (“Packets whose headers indicate the same destination may be assumed to belong to the same session.”)) and identifies the problem as “[t]he same user may be running several different sessions simultaneously and mere packet header analysis may not be able to distinguish between them” (*id.* at 2:9–11). As a result, we understand the ’629 Patent to disparage the use of destination ports or destination addresses only, instead of disparaging the use of header information.

Also as explained in the Institution Decision, we do not agree that “packet length” is not found in the header. Dr. Nakibly acknowledges that packet length is an IP packet field that “refers to the length of the IP header and its payload.” Ex. 2001 ¶ 36. Dr. Nakibly faults this header information for “not includ[ing] the sum of lengths of other headers and trailers of layer 2 the packet may have” (*id.*), but does not explain why the length of the layer 2 frame would matter for purposes of the packet analysis method disclosed in the ’629 Patent. The ’629 Patent discloses a “media session identification method *for IP networks*” (Ex. 1001, 1:17–18), “relates to IP

⁴ Even if considered, as explained below in more detail, we do not agree with Patent Owner’s arguments.

traffic inspection” (*id.* at 6:9), and “inspection of high bandwidth IP traffic” (*id.* at 11:2). In some places, the ’629 Patent refers to “higher layers” of the OSI network model (*see, e.g.*, Ex. 1001, 9:20, 9:66), but it never once refers to “lower layers” or to layer 2 specifically. We therefore understand “packet length,” as used in the ’629 Patent, to refer to the length of an IP packet (*i.e.*, layer 3), not to the length of a layer 2 frame. As a result, we determine that “packet length” is found in the header and, therefore, we do not agree that the embodiments describing the use of packet length requires more than header information.

Moreover, and as explained in the Institution Decision, even if “packet length” does not constitute header information, the ’629 Patent states explicitly that “[t]raffic characteristics . . . includes features such as packet length, inter-arrival period, bandwidth and statistical and other derivations thereof *as well as certain header characteristics* such as source address and destination address.” Ex. 1001, 6:11–17 (emphasis added). Contrary to Patent Owner’s assertion, the most natural interpretation of this sentence is that “traffic characteristics” includes certain header information. This interpretation also is consistent with the ’629 Patent disclosure that packet characteristic extractor 18 “extracts readily available packet traffic characteristics such as packet length or inter-arrival period, *or source or destination addresses* or other traffic characteristics of the packets.” *Id.* at 6:45–49 (emphasis added). As a result, we construe “traffic packet characteristics” to encompass characteristics derived exclusively from header information.

In any event, even if we consider Patent Owner’s belated arguments and evidence presented in the Sur-Reply (*see* Sur-Reply 3–7), we do not agree with Patent Owner’s arguments. The foundation of Patent Owner’s

belated arguments are: (1) the total packet length referenced in Dr. Nakibly's testimony is the same packet length used as a traffic packet characteristic in the '629 Patent (*see* Sur-Reply 4, 6); and (2) the '629 Patent manages packets at the application layer (i.e., layer 7) (*see* Sur-Reply 5 (citing Ex. 2001 ¶ 87)). Patent Owner's assertions are not supported by sufficient underlying fact. Specifically, Patent Owner does not direct us to sufficient underlying facts to support its attorney argument that "total packet length" is the packet length used in the '629 Patent. *See* Sur-Reply 4, 6. Argument of counsel cannot take the place of objective evidence. *See Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (unsworn attorney argument is not evidence). Patent Owner's proffered evidence also does not provide sufficient support for the assertion that the '629 Patent manages packets at the application layer. Patent Owner directs attention to paragraph 87 of Dr. Nakibly's Declaration in which he testifies that "[a] session is a set of packets [that] belong to a layer 7 media exchange (a conversation between two end entities)." Dr. Nakibly's testimony, however, does not address whether the '629 Patent discloses the layer(s) at which the packets are managed. As highlighted above, the '629 Patent discloses a "media session identification method *for IP networks*" (Ex. 1001, 1:17–18 (emphasis added)), "relates to IP traffic inspection" (*id.* at 6:9), and "inspection of high bandwidth IP traffic" (*id.* at 11:2), which suggest that the packets are "managed" at the network layer (i.e., layer 3). Moreover, we give little weight to Dr. Nakibly's testimony that a session is a set of packets that belong to a layer 7 media exchange because Dr. Nakibly does not disclose sufficient underlying facts to support this testimony. *See* Ex. 2001 ¶ 87; 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or

no weight.”). Accordingly, even if Patent Owner’s belated arguments are considered, we cannot agree with these arguments because they are not supported by sufficient underlying facts.

2. “Session” (Claim 15)

Independent Claim 15 recites multiple instances of “session type,” “presumed session,” and “session characteristics.” *See* Ex. 1001, 13:26–39. Patent Owner contends that the term “session” does not encompass a “flow,” as that term is utilized in the Pappu reference. *See* PO Resp. 21; Prelim. Resp. 16 (same argument). Patent Owner asserts that flows are distinct from and are not sessions. *See* PO Resp. 21 (citing Ex. 2001 ¶¶ 86–92); Prelim. Resp. 16 (same argument). According to Patent Owner, “[a] session is a set of packets that relates to an application-level (i.e., layer-7), bi-directional communication.” PO Resp. 21 (citing Ex. 2001 ¶ 87); *see* Prelim. Resp. 16 (same argument). Patent Owner argues that a session’s packets may belong to multiple flows, and that a flow may include packets from multiple sessions. *See* PO Resp. 21 (citing Ex. 2001 ¶ 87); Prelim. Resp. 16 (same argument). According to Patent Owner, “[a] session, as opposed to a flow: (1) is end-to-end as opposed to ending at network address translation boundaries; (2) necessitates a stateful inspection; (3) is bi-directional; and (4) is multiple in that multiple sessions can be in a single flow.” PO Resp. 21 (citing Ex. 2001 ¶ 92); *see* Prelim. Resp. 16 (same argument). Patent Owner alleges that “Petitioner acknowledges the distinction between managing sessions and managing flows by arguing that one of ordinary skill in the art ‘would have understood that taking into consideration that packets can belong to an identified or potential session is a better use of available resources than treating all flows interchangeably.’” PO Resp. 22 (quoting

Pet. 45); *see* Prelim. Resp. 17 (same argument). Patent Owner further argues that Petitioner recognized the distinction between sessions and flows in their product documentation that “describes a session as ‘defined by *two uni-directional flows* each uniquely identified by a 6-tuple key: source-address, destination- address, source-port, destination-port, protocol, and security zone.’” PO Resp. 22 (quoting Ex. 2002, 1); *see* Prelim. Resp. 17 (same argument).

In reply, Petitioner argues that Patent Owner provides no intrinsic or extrinsic evidence to support its assertions that a session must be bi-directional and made up of packets that belong to multiple flows. *See* Reply 11 (citing PO Resp. 21–22; Prelim. Resp. 16–17). Petitioner contends that Patent Owner repeats its arguments from the Preliminary response relying on conclusory statements from Dr. Nakibly’s declaration. *See id.* at 12 (citing PO Resp. 21–22; Prelim. Resp. 16–17; Ex. 2001 ¶¶ 85–92).

Petitioner argues that Dr. Nakibly fails to disclose any intrinsic evidence or factual support for his opinion regarding various attributes of a session, and therefore, it should be entitled to little, if any, weight. *See id.* (citing Ex. 2001 ¶¶ 85–92; 37 C.F.R. § 42.65(a)). Petitioner further contends that the claims do not impose requirements of bi-directionality and inclusion of multiple flows for the term “session.” *See id.* at 12. Petitioner points out that, contrary to Patent Owner’s asserted requirements for “session,” the ’629 Patent discloses “a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions.” *Id.* (quoting Ex. 1001, 1:18–21). According to Petitioner, this “suggests that multiple media sessions can be identified *from* the flow of packets, where the ’629 Patent uses the term ‘flow of packets’ generically to mean IP based media traffic over networks.” *Id.* at 13 (citing Ex. 1001, 16–

28; Ex. 1011 ¶ 10). Petitioner argues the '629 Patent disclosure does not require that a session be bi-directional because it expressly includes video streams as a “session,” which, according to Petitioner are well-known to be unidirectional. *See id.* (quoting Ex. 1001, 1:20–23; citing Ex. 1011 ¶ 11).

In response to Petitioner’s Reply arguments, Patent Owner asserts that Petitioner does not provide any technical support for its arguments, and does not provide any technical rebuttal of Dr. Nakibly’s opinion of how one of ordinary skill in the art would understand a “session.” *See* Sur-Reply 11. According to Patent Owner, Petitioner’s only support for their position is Petitioner’s witness Dr. Russ’s testimony that the '629 Patent uses the term flow of packets generically to mean IP based media traffic over networks. *See id.* at 12 (citing Reply 11–14; Ex. 1001 ¶ 10). Patent Owner contends that “Dr. Nakibly’s position—that one of ordinary skill in the art would recognize important, substantive differences between a session and a flow (e.g., EX2001 ¶¶ 85–96)—is supported by literature from a variety of technical sources.” *Id.* (citing Ex. 2012, 1; Ex. 2014, 4:47–52; Ex. 2009). Patent Owner again contends that Petitioner’s own literature explicitly distinguishes sessions and flows based on the following disclosures: (1) “On a Palo Alto Networks firewall, a session is defined by two uni-directional flows each uniquely identified by a 6-tuple key;” and (2) “[T]wo-way connections between a pair of network devices (e.g., client-server) are referred to as a session where a session is composed of two flows representing data traffic in both directions.” *Id.* (quoting Ex. 2012, 1; Ex. 2014, 4:47–52). Patent Owner contends that other technical sources recognize this distinction. *See id.* (citing Ex. 2009).

In reply to Patent Owner’s Response, Petitioner also argues, “each of the '629 Patent, Pappu, and Peleg, provide voice over internet protocol

(VOIP) and video streaming over IP as an example of a session or flow, thus confirming they are all referring to the same concept.” Reply 13 (citing Ex. 1001, 1:20–23; Ex. 1004, Abstract, 6:34–37; Ex. 1006 ¶ 20; Ex. 1011 ¶ 12); *see id.* at 14–15 (quoting Ex. 1001, 3:40–42; Ex. 1004, 6:16–17; 1004, 2:23–53; citing Ex. 1001, 1:46–55; Ex. 1003 ¶ 49; Ex. 1004, 6:33–42; Ex. 1011 ¶¶ 11, 14); *see id.* at 16 (citing Ex. 1006 ¶ 20). Petitioner asserts that Patent Owner argues that the same VOIP and video streaming applications are necessarily bi-directional when disclosed as examples in the ’629 Patent but are unidirectional for the purposes of Pappu and Peleg. *See id.* at 13 (citing PO Resp. 8, 34; Prelim. Resp. 22, 24); *see also id.* at 16 (citing PO Resp. 31–32; similar argument). Petitioner contends that a person of ordinary skill in the art “would have understood that there is no substantive difference between the ‘session’ described in the ’629 Patent, the ‘flow’ described in Pappu, and the ‘session’ described in Peleg.” *Id.* at 14 (citing Ex. 1003 ¶¶ 99, 102, 103).

In response, Patent Owner argues that Petitioner’s arguments reflect a fundamental misunderstanding of how networks function. *See* Sur-Reply 14. Referencing certain disclosures of Exhibits 2007, 2010, and 2016, Patent Owner asserts that “[w]hen the ’629 patent describes managing VOIP sessions, it does so *in the context of the higher layers* of the OSI network model.” *Id.* at 15 (quoting Ex. 1001, 8:21–27); *see id.* at 14–15 (reproducing Ex. 2014, 1–2 (Table 3); quoting Ex. 2016, 2; Ex. 2010, 1). Patent Owner contends that Pappu describes managing VOIP flows only in the context of layer 4 and Peleg describes managing VOIP sessions in the context of layers 3 and 4. *See id.* at 16 (quoting Ex. 1004, 9:39–47; Ex. 1005 ¶ 57).

We begin our analysis of the broadest reasonable interpretation for “session” by turning first to the intrinsic evidence — the ’629 Patent. In *Phillips v. AWH Corp.*, the court emphasized the importance of a patent’s specification as intrinsic evidence for construing claim terms. *See* 415 F.3d 1303, 1315–17 (Fed. Cir. 2005) (en banc). “[T]he specification . . . is the single best guide to the meaning of a disputed claim term.” *Id.* at 1314 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Extrinsic evidence, such as expert testimony, may be useful but is unlikely to result in a reliable interpretation of claim scope unless considered in the context of the intrinsic evidence. *See Phillips*, 415 F.3d at 1319.

The ’629 Patent discloses:

The present invention, in some embodiments thereof, relates to a media session identification method for IP networks and, more particularly, but not exclusively, to a media session identification method that identifies media sessions from the flow of packets and assigns specific packets to the media sessions.

Ex. 1001, 1:17–22. We agree with Petitioner that this disclosure suggests that multiple sessions can be identified from a single flow of packets. *See* Reply 13. Therefore, in light of the ’629 Patent Specification, we decline to limit the broadest reasonable interpretation for “session” as requiring the packets of a session to belong to multiple flows, as argued by Patent Owner. *See* PO Resp. 21.

The ’629 Patent also explicitly includes a data stream (i.e., streaming of data), such as a video stream within the meaning of “session.” Ex. 1001, 1:22–23 (“the term ‘session’ includes streaming of data, such as in for example a video stream.”). Likewise, the ’629 Patent discloses: “[o]ne of the characteristics of a media session is the tendency to consist of a *packet*

stream having a low variation in packet length and/or inter-arrival periods.” Ex. 1001, 3:9–11 (emphasis added). Throughout the ’629 Patent, the terms “session” and “stream” are used interchangeably. *See* Ex. 1001, 1:46–59, 6:1–15, 8:1–5, 8:58–9:21. Similarly, the ’629 Patent discloses “[a] media session, such as a voice or video session, is expected to have a *continuous stream of sampled data* so it can be reconstructed at its destination to produce sound or images or both.” Ex. 1001, 1:36–39 (emphasis added). This same disclosure also suggests that a session may be a unidirectional data stream, i.e., from a source to a destination. Accordingly, in view of the ’629 Patent, we decline to limit the broadest reasonable interpretation for “session” to bi-directional communication, as argued by Patent Owner. *See* PO Resp. 21, 34.

The ’629 Patent discloses that marked media session packets are assembled to create various media streams that are subsequently analyzed using predefined mathematical and statistical techniques for determining more specific conclusions on the media session protocol, application, and end-devices being used. *See* Ex. 1001, 8:10–15. The ’629 Patent further discloses, “a packet length histogram may be created by the algorithm and can be used to determine whether the media is using a Constant Bit Rate (CBR) Codec . . . or a Variable Bit Rate (VBR) Codec (such as the GIPS codec).” *Id.* at 8:21–27; *see id.* at 7:8–16 (“session analyzer 14 analyzes the grouped together packets to obtain characteristics that could provide information about the session type and requirements,” and “[i]f possible, an accurate session type, such as a video session using codec type X or voice session using SkypeTM, is obtained”). We understand these ’629 Patent disclosures to describe statistical techniques that can be used to determine conclusions regarding layers 5–7 of the OSI model because the OSI model

(Ex. 2002, 1–2 (Table 3)) includes session protocols in layer 5, codecs in layer 6, and applications in layer 7. We decline to limit the broadest reasonable interpretation for “session” to *higher layers* of the OSI network model, as argued by Patent Owner, because it is improper to read limitations into the claims from particular embodiments or examples given in the specification. *See Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988). Moreover, we do not agree that the ’629 Patent disclosure is limited to determining conclusions related to layers 5–7 of the OSI model, as suggested by Patent Owner. The ’629 Patent also discloses that the session analyzer analyzes grouped together packets to obtain characteristics to provide information about the session type and its requirements, such as a video session having a real-time quality of service. *See id.* at 7:8–14. “[A] video session requiring real time quality of service may receive high bandwidth and its packets may be given high priority.” *Id.* at 7:37–39. These disclosures of determining whether a session is a video session having a real-time quality of service, suggest that the ’629 Patent discloses determining conclusions related to other layers of the OSI model, such as network layer 3 of the OSI model. *See* Ex. 2007, 1 (“VoIP is a Layer 3 network protocol.”), 6 (“Quality of service refers to the ability of a network to provide differentiated service to selected network traffic over various underlying technologies.” . . . “[Y]ou institute QoS by strategically enabling appropriate QoS features throughout your network.”). Therefore, we decline to limit the broadest reasonable interpretation for “session” to higher layers of the OSI model, such as layers 5 through 7, as argued by Patent Owner.

In sum, we decline to construe “session” in the context of the ’629 Patent as requiring the packets of a session to belong to multiple flows,

limited to bi-directional communication, and limited to higher layers of the OSI model, such as layers 5 through 7. We find that, in the context of the '629 Patent, the broadest reasonable interpretation of "session" includes "a data stream or a packet stream," as disclosed in the '629 Patent.

Next we turn to the extrinsic evidence cited by Patent Owner in support of its proposed construction for "session." Exhibit 2002 discloses: "[o]n a Palo Alto Networks firewall, a session is defined by two uni-directional flows each uniquely identified by a 6-tuple key: source-address, destination-address, source-port, destination-port, protocol, and security-zone." Ex. 2002, 1. We give little weight to Exhibit 2002 because the definition for "session" is limited to "on a Palo Alto Networks firewall." We also give little weight to Exhibit 2002 because Patent Owner does not provide a publication date for the webpage of Exhibit 2002, thereby failing to provide useful information regarding how the term "session" would have been understood by a person of ordinary skill in the art at the time of the invention, i.e., the May 2006 effective filing date of the '629 Patent. *See* Ex. 2002, 1; PO Resp. iii.

Dr. Nakibly's testimony regarding the meaning of a session (Ex. 2001 ¶¶ 86–92) also is entitled to little weight because it is not supported by a sufficient factual basis. *See* Ex. 2001 ¶¶ 86–92; 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). Patent Owner's belated evidence (Exhibits 2009, 2012, and 2014) to bolster Dr. Nakibly's testimony also is entitled to little weight. Exhibits 2009, 2012, and 2014 fail to provide useful information regarding how one with ordinary skill in the art would have understood the meaning of "session" at the time of the invention, i.e., the May 2006 effective filing date of the '629 Patent.

Patent Owner provides a 2010 date for Exhibit 2009 and a February 2019 date for Exhibit 2012. *See* Sur-Reply, iii; Ex. 2012, 1. Exhibit 2014 has a July 2015 publication date, and a March 2013 actual filing date. *See* Ex. 2014, [22], [45]. Each of these Exhibits, with dates long after the November 2006 effective filing date of the '629 Patent, fails to provide useful information regarding how one with ordinary skill in the art would have understood the ordinary and customary meaning of “session” at the time of the November 2006 effective filing date of the '629 Patent. Moreover, Patent Owner does not direct us to where Exhibit 2009 addresses the meaning of “session.” Exhibit 2012 is identical to Exhibit 2002, where the definition for “session” in Exhibit 2012 is limited to “on a Palo Alto Networks firewall.” *See* Ex. 2012, 1; Exhibit 2002, 1. Similar to Exhibits 2002 and 2012, the discussion of “session” in Exhibit 2014 appears to be limited to the description of Exhibit 2014. *See* Ex. 2014, 4:47–52 (“*in the present description*, two-way connections between a pair of network devices (e.g., client-server) are referred to as a session where a session is composed of two flows representing data traffic in both directions—that is, the forward direction (client to server) and the reverse direction (server to client).”).

Next, we analyze the extrinsic evidence cited by Petitioner to support its arguments. Pappu (Ex. 1004) discloses that flows represent streaming media traffic, audio/video streaming traffic, and VOIP (*see* Ex. 1004, Abstract, 3:26–28; 6:33–37; 9:18–48; 10:36–41; 14:14–22), and Peleg (Ex. 1006) discloses VOIP, multimedia over IP, video over IP, streaming, and video as examples of types of sessions (*see* Ex. 1006 ¶¶ 20, 34, 47, 77, 79). Thus, Pappu uses the term “flow” and Peleg use the term “sessions” for describing the same things — streaming media, multimedia, audio, video, and VOIP. We further note that, in contrast to Patent Owner’s assertions

that a session is bi-directional, Peleg, which has a May 2006 filing date contemporaneous with the effective filing date of the '629 Patent, discloses: “[as] known in the art, sessions, by definition, are unidirectional, and therefore each packet should belong to one unidirectional session.” Ex. 1006 ¶ 65. We give substantial weight to Peleg’s contemporaneous definition for “session” because it provides useful information regarding how one with ordinary skill in the art would have understood the meaning of “session” at the time of the invention. For these additional reasons, we decline to limit the broadest reasonable interpretation for “session” to bi-directional communication, and distinct from a flow, as argued by Patent Owner.

After according appropriate weight and consideration to the intrinsic and extrinsic evidence before us, we decline to adopt Patent Owner’s proposed constructions for “session,” and instead find the broadest reasonable interpretation of “session,” in light of the '629 Patent includes “a data stream or packet stream.”

3. “Thresholding” (Claim 18)

Dependent claim 18 recites “thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.” Neither party proposes an explicit claim construction for “thresholding” or “threshold.” *See generally* Pet.; PO Resp. Patent Owner argues implicitly that the construction for “threshold” cannot include “a binary choice of ‘everything either matches or it doesn’t.’” *See* PO Resp. 28 (citing Ex. 2001 ¶¶ 135–138); Prelim. Resp. 25–26.

The '629 Patent does not include an explicit definition for “thresholding” or “threshold.” *See generally* Ex. 1001. According to the '629 Patent,

Thresholding of the packet length and packet inter-arrival period, or of a derivative such as statistical variations, sets a basic acceptance criterion for a packet to be considered as part of a media stream, against which each consecutive incoming IP packet is examined. Those packets that meet the acceptance criteria are categorized and marked, at high probability, as media session packets, while those packets that do not meet the acceptance criteria are filtered out or ignored as appropriate.

Ex. 1001, 8:1–9. Therefore, in the context of the '629 Patent Specification, the broadest reasonable interpretation of “thresholding” or “threshold” includes “a basic acceptance criterion.”

We do not give substantial weight to Dr. Nakibly's testimony that “[a] binary choice of everything either matches or it doesn't” does not constitute a “threshold,” because Dr. Nakibly does not provide underlying facts to support this opinion. *See* Ex. 2001 ¶ 137; 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

After according appropriate weight and consideration to the intrinsic and extrinsic evidence before us, we decline to adopt Patent Owner's proposed construction for “thresholding” or “threshold,” and instead find the broadest reasonable interpretation for “thresholding” or “threshold” in light of the '629 Patent includes “a basic acceptance criterion.”

4. “Said Characteristics” (Claim 19)

Dependent claim 19 recites “said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.” Independent claim 15, from which claim 19 depends,

recites “traffic packet characteristics,” “said traffic packet characteristics,” “session characteristic,” and “said session characteristics.” In the Institution Decision, we interpreted “said characteristics” recited in claim 19 as referring to the “traffic packet characteristics” recited in claim 15. *See* Dec. 17.

Petitioner argues that the Institution Decision overlooked that claim 15 recites both “traffic packet characteristics” and “session characteristics.” *See* Reply 25. According to Petitioner, “either of ‘traffic packet characteristics’ or ‘session characteristics’ provides antecedent support for ‘said characteristics’ in Claim 19.” *Id.* Petitioner further contends that that there is no support for limiting the recitation of “said characteristics in claim 19 to only “traffic packet characteristics.” *See id.* Petitioner points out that the ’629 Patent discloses that an inter-arrival period can be a “traffic packet characteristic” and can also be a “session characteristic” when used to identify the session type, and claims “inter-arrival period” as a “session characteristic.” *See id.* at 25–26 (quoting Ex. 1001, 6:19–22, 7:26–28, 10:62–64, 12:44–48 (claim 10)).

In response, Patent Owner asserts Petitioner’s claim construction would render claim 19 indefinite because one with ordinary skill in the art would not have reasonable certainty regarding the scope of claim 19. *See* Sur-Reply 21–22 (citing Manual of Patent Examining Procedure § 2173; *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910–11 (2014); *Leibel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 911 (Fed. Cir. 2004)).

We agree with Petitioner that “said characteristics” recited in claim 19 refers to either the “traffic packet characteristics” or the “session characteristics,” recited in claim 15. We do not agree that this interpretation would render claim 19 indefinite because in assessing whether a claim is

definite “claims are to be read in light of the patent’s specification and prosecution history.” *Nautilus*, 572 U.S. at 908; *see id.* at 910. The ’629 Patent discloses that the “traffic packet characteristics” and the “session characteristics” can be the same characteristics. Specifically, the ’629 Patent discloses that “the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.” Ex. 1001, 4:6–8; *see id.* at 6:11–19. The ’629 Patent also discloses, “[t]he traffic characteristics may also be used to identify the session type so that appropriate resources can be made available or not for the session, or other provisioning and control actions may be applied to the session.” *Id.* at 6:19–22; *see id.* at 7:26–27. The ’629 Patent further discloses that “the session analyzer is configured to obtain the characteristics belonging to the common session . . . the session analyzer is configured to use at least one member of the group consisting of: packet length, inter-arrival period” *Id.* at 4:14–55.

We also are not persuaded by Patent Owner’s argument that the different terms “packet traffic characteristics” and “session characteristics” are presumed to mean two different things. *See* Sur-Reply 22 (citing *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 93 F.3d 1572, 1579 (Fed. Cir. 1996)). According to Patent Owner, “[j]ust because an item can belong to two different sets ***doesn’t mean the two sets are identical.***” *Id.* Petitioner does not assert, nor do we find, that “traffic packet characteristics” and “session characteristics” have identical meanings. Rather, as explained above, the ’629 Patent Specification supports finding “traffic packet characteristics” and “session characteristics” can include the same data, such as packet length or inter-arrival period.

In sum, the '629 Patent Specification supports interpreting “said characteristics” recited in dependent claim 19 as referring to either “traffic packet characteristics” or “session characteristics,” recited in claim 15.

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented 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) objective evidence of non-obviousness, when in evidence.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

If a single prior art reference discloses each of the claim limitations, however, there is no requirement to make findings regarding a reason to combine. *See Realtime Data, LLC, v. Iancu*, 912 F.3d 1368, 1373 (Fed. Cir. 2019) (finding the Board was not required to make any findings regarding reasons to combine given its reliance on a single prior art reference; quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) for

⁵ Patent Owner does not present objective evidence of non-obviousness. *See generally* PO Resp.

“a disclosure that anticipates under § 102 also renders the claim invalid under § 103, for anticipation is the epitome of obviousness.” (internal quotations omitted)).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Unpatentability of Claims 15 and 17–20 over Pappu

1. Overview of Pappu (Ex. 1004)

Pappu discloses “a mechanism for effectively identifying, classifying, and controlling information packet flows in a network.” Ex. 1004, 2:35–36. Pappu discloses, “[i]n one embodiment of the invention, packets are grouped into a flow if those packets share a sufficient amount of header information,” for example, “packets are deemed to belong to the same flow if they have the five tuple in common” (i.e., source address, source port number, destination address, destination port number, transport layer protocol). *Id.* at 6:17–25.

To make the best use of available resources, and to best control the traffic that passes through the router, it is beneficial to identify different types of traffic and take specific appropriate actions relative to those types of traffic. *See* Ex. 1001, 6:38–42. “[I]n one embodiment of the invention, line

cards 202 [of router 102] are adapted to include a flow manager (FM) 210 for keeping track of flows, determining what behaviors those flows are exhibiting, and applying user-specified actions to those flows based on those flows' exhibited behaviors.” *Id.* at 6:44–49. When FM 210 receives a packet, it determines whether that packet matches any existing “flow block” data structure, and if it matches, it is deemed to belong to the flow that corresponds to that flow block. *See id.* at 7:8–12. If the packets does not match an existing flow block, then FM210 creates a new flow block for a new flow. *See id.* at 7:12–14. As the packets of flows are processed, a set of behavioral statistics are maintained and stored in the flow block for the corresponding flows. *See id.* at 2:55–58, 7:21–27, Fig. 3:302. Behavioral statistics include, *inter alia*, flow rate, average inter-packet gap, instantaneous flow rate, and moving average flow rate. *See id.* at 2:59–67, 7:28–54, Fig. 4. The type of traffic that a particular flow represents can be estimated from that flow's behavioral statistics. *See id.* at 2:41–47, 8:26–27. Different flows may be handled in different ways, yet different flows that are associated with similar behavioral statistics may be handled in similar ways. *See id.* at 3:22–23, 8:1–3.

2. Analysis of Claim 15

a. A method of identifying session type

Petitioner contends that Pappu discloses “[a] method of identifying session type,” as recited in the preamble of claim 15. *See* Pet. 38–39. Petitioner bases its contention on Pappu's disclosure of identifying, classifying, and controlling information packet flows in a network, and identifying a particular type of traffic, such as VOIP, gaming, streaming, etc. *See id.* (quoting Ex. 1004, Abstract, 2:34–44; citing Ex. 1003 ¶¶ 91–92);

see also id. at 48–49 (addressing “using said session characteristics to identify a session type of said presumed session.”). Patent Owner does not dispute Petitioner’s contentions addressing this limitation. *See generally* PO Resp.

Based on Petitioner’s cited evidence, we find that Pappu discloses or teaches “a method of identifying session type,” as recited in claim 15. *See* Ex. 1004, Abstract, 2:34–44; Ex. 1003 ¶¶ 91–92).

b. obtaining passing packets of respectively unknown sessions and . . . types

Petitioner asserts that Pappu discloses “obtaining passing packets of respectively unknown sessions and unknown session types,” as recited in claim 15. *See* Pet. 39–40. Petitioner’s assertion is based on Pappu’s disclosure that flow manager (“FM”) 210 is “on a line card that is acting as an egress line card (i.e., the line card is receiving packets from an ingress line card and sending packets out to another router)” that “receives and processes a packet that does not match any previously established flow.” *See id.* (quoting Ex. 1004, 6:63–66, 7:4–16; citing Ex. 1003 ¶ 93). Patent Owner does not dispute Petitioner’s contentions addressing this limitation. *See generally* PO Resp.

Based on Petitioner’s cited evidence, we find that Pappu discloses or teaches “obtaining passing packets of respectively unknown sessions and unknown session types,” as recited in claim 15. *See* Ex. 1004, 6:63–66, 7:3–16, Fig. 2; Ex. 1003 ¶ 93.

*c. obtaining traffic packet characteristics of said passing packets . . . ;
comparing said obtained packets with each other using respectively
obtained traffic packet characteristics;
grouping together those packets having similar values of said
traffic packet characteristics into a presumed session*

Petitioner contends that Pappu discloses: (1) “obtaining traffic packet characteristics of said passing packets of respectively unknown session types;” (2) “comparing said obtained packets with each other using respectively obtained traffic packet characteristics;” and (3) “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as recited in claim 15. *See* Pet. 40–43. Petitioner bases its contentions on Pappu’s disclosure of grouping packets into a flow if the packets share a sufficient amount of header information, and, in one embodiment, deeming packets to belong to the same flow if two or more packets have the same source address, source port number, destination address, destination port number, and transport layer protocol, i.e., the five-tuple. *See id.* at 40–42 (quoting Ex 1004, 6:17–26; citing Ex. 1001, 6:8–17 (traffic characteristics include header characteristics such as source address and destination address); Ex. 1003 ¶¶ 94–99). According to Petitioner, a person of ordinary skill in the art “would have understood that determining if packets ‘share a sufficient amount of header information’ and that determining ‘if two or more packets have the same source address, the same source port number, the same destination address, the same destination port number, and the same transport layer protocol’ are both comparisons of packets/traffic packet characteristics with each other.” *Id.* at 42 (citing Ex. 1003 ¶ 98). Petitioner contends that, “Pappu discloses that this grouping into a flow is not necessarily sufficient to identify the specific session and therefore the

grouping is only a *presumed* session.” *Id.* at 43 (emphasis added) (quoting Ex. 1004, 8:16–25 (“the packet’s five tuple alone does not necessarily determine which actions router 102 will apply to that packet. This is because the five tuple lacks the information that categorizes the traffic as being P2P, VOIP, online gaming traffic, or another kind of traffic.”); citing Ex. 1003 ¶ 100). According to Petitioner, “[b]ecause the received packet does not match an existing packet flow, and it is not yet determined what type of flow the packet belongs to, a new flow is ‘presumed’: ‘the packet is assumed to be the first packet of a new flow.’” *Id.* (quoting Ex. 1004, 14:50–51; Ex. 1003 ¶ 101).

Patent Owner contends that Pappu does not disclose any of the “traffic packet characteristics” limitations because, according to Patent Owner, the term requires more than packet header information when properly construed. *See* PO Resp. 16–20, 24. Patent Owner contends that because Pappu teaches using header-only information (i.e., the five-tuple), Pappu does not disclose parameters including more than packet header information. *See id.* at 18. In reply, Petitioner points out that Patent Owner does not contest that “traffic packet characteristics” are disclosed by Pappu if Patent Owner’s proposed construction is rejected. *See* Reply 6 (citing PO Resp. 16–20).

We do not agree with Patent Owner’s arguments, because as explained above in Section II.A.1., we do not adopt Patent Owner’s proposed construction for “traffic packet characteristics.” As explained in Section II.A.1., the broadest reasonable interpretation for “traffic packet characteristics” encompasses characteristics derived exclusively from header information. Therefore, we do not agree that Pappu’s header information or five-tuple fails to disclose or teach the claimed traffic packet characteristics. We find that Pappu’s header information including source address, source

port number, destination address, destination port number, and transport layer protocol, i.e., the five-tuple, discloses or teaches “traffic packet characteristics” in accordance with its broadest reasonable interpretation.

Patent Owner also argues that Pappu does not disclose “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as recited in claim 15, because Pappu does not disclose managing sessions. *See* PO Resp. 21. Patent Owner argues that Pappu discloses managing flows, which “are distinct from and are not sessions.” *Id.* (citing Ex. 2001 ¶¶ 85–92); *see id.* at 25 (arguing that Pappu does not teach “sessions” and therefore does not teach “presumed sessions” (citations omitted)). In reply, Petitioner argues that a person of ordinary skill in the art “would have understood that ‘flows’ described in Pappu correspond to the ‘sessions’ described in the ’629 Patent, with both their goals being to group packets into common traffic types in order to make best use of resources to control the packets.” Reply 15 (quoting Ex. 1004, 6:38–42; Ex. 1001, 6:19–22; citing Ex. 1011 ¶ 115).

We do not agree with Patent Owner’s arguments because they are premised on Patent Owner’s proposed construction of “session,” which, as explained above in Section II.A.2., we decline to adopt. As explained in Section II.A.2., the broadest reasonable interpretation for “session,” in the context of the ’629 Patent, includes “a data stream or a packet stream.” We find that Pappu’s “flows” disclose or teach a “session” in accordance with its broadest reasonable interpretation.

In summary, after considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “obtaining traffic packet characteristics of said passing packets of respectively unknown session types,” “comparing said obtained packets with each other using respectively

obtained traffic packet characteristics,” and “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as recited in claim 15. *See* Ex. 1004, 6:17–26, 6:38–42; 8:16–25, 14:50–51; Ex. 1003 ¶¶ 94–101; Ex. 1011 ¶ 115.

*d. analyzing said grouped packets . . . for session characteristic[s];
using said session characteristics to identify a session type*

Petitioner asserts that Pappu discloses “analyzing said grouped packets of said presumed session for session characteristic[s],” as recited in claim 15. *See* Pet. 46. Petitioner’s assertion is based on Pappu’s disclosure of creating a flow block including the Flow ID and a set of behavioral statistics for the flow. *See id.* (citing Ex. 1004, 7:21–27, 14:50–56, Fig. 4; Ex. 1003 ¶¶ 105–106). According to Petitioner, the behavioral statistics include Total Byte Count, Life Duration, Flow Rate, Number, Average Packet Size, Average Packet Rate, Average Inter-Packet Gap, Moving Average Flow Rate, Instantaneous Flow Rate, and Flow Block Creation Timestamp, and averaging individual packet characteristics including packet size, packet rate, and inter-packet gap. *See id.* at 46–48 (reproducing Ex. 1004, Fig. 4; quoting Ex. 1004, 7:34–42; citing Ex. 1004, 7:28–50; 14:57–15:5; Ex. 1003 ¶¶ 106–107). Petitioner also cites Pappu’s disclosure that flow manager (FM) 210 “keep[s] track of flows, determin[es] what behavior those flows are exhibiting, and appl[ies] user-specified actions to those flows based on those flows’ exhibited behavior.” *Id.* at 48 (citing Ex. 1004, 6:44–49; Ex. 1003 ¶ 108).

Petitioner also contends that Pappu discloses “using said session characteristic to identify a session type of said presumed session,” as recited in claim 15. *See* Pet. 48–49. Petitioner bases its contention on Pappu’s disclosure that “[t]he type of traffic that a particular flow represents can be

estimated from that flow's behavioral statistics.” *See id.* (quoting Ex. 1004, 8:26–27; citing Ex. 1003 ¶ 109). According to Petitioner, Pappu teaches determining whether flows are, e.g., “VOIP traffic” or “online gaming traffic.” *See id.* at 48–49 (quoting Ex. 1004, 9:39–48, 10:17–27; citing Ex. 1003 ¶ 110).

For the same reasons as those explained immediately above in Section II.C.2.c., we do not agree with Patent Owner's argument that Pappu “does not disclose managing sessions. PO Resp. 21 (citing Ex. 2001 ¶¶ 85–92); *see id.* at 20–27. As explained above in Sections II.A.2. and II.C.2.c., we decline to adopt Patent Owner's construction for “session.” We find that Pappu's “flows” disclose or teach a “session” in accordance with its broadest reasonable interpretation that includes “a data stream or a packet stream.”

Related to its arguments regarding “session,” Patent Owner contends that, because “*Pappu's* focus [is] on flow management (as opposed to session management),” Pappu does not disclose “analyzing said grouped packets of said presumed session for session characteristic[s],” as recited in claim 15. PO Resp. 7. According to Patent Owner, “[a]nalyzing grouped packets in a session requires the ability to compare packets or subsets of packets *to one another* because a session may include multiple flows.” *Id.* at 7–8 (citing Ex. 2001 ¶ 115); *see id.* at 9 (similar argument, citing Ex. 2001 ¶ 121). Patent Owner contends that “*Pappu's* ‘behavioral statistics’ cannot be used to compare packets or subsets of packets to one another because behavior statistics strip out all *packet-specific* information.” *Id.* at 8 (citing Ex. 2001 ¶ 110); *see id.* at 11 (similar argument); *see also id.* at 8–10 (arguing Pappu teaches aggregate data, and averaged data). Patent Owner also argues, “[a] session may treat packets differently based on the user application needed.” *Id.* at 8 (citing Ex. 2001 ¶¶ 91, 109). Patent Owner

contends that “*Pappu* teaches only statistics that may be useful in managing flows in which **every packet is treated the same**, such as, averages of behavior statistics across packets in a flow.” *Id.* (citing Ex. 2001 ¶ 109); *see id.* at 9–10 (arguing Pappu manages packets by subjecting all packets to the same policies).

In reply, Petitioner contends that Patent Owner’s arguments are inaccurate because: (1) the ’629 Patent describes session characteristics as expressly including aggregated packet data such as average inter-arrival period and average length, and (2) Pappu expressly includes “packet specific information” such as packet size and inter-arrival gap between two packets. *See* Reply 18–19 (quoting Ex. 1001, 7:42–46; 8:28–30, 8:58–63, 8:66–9:2; citing Ex. 1003 ¶¶ 46, 106; Ex. 1011 ¶ 18). Petitioner further asserts that the ’629 Patent and Pappu address the same goal because the ’629 Patent discloses grouping packets into sessions having a common traffic type and applies a policy for the specific traffic type to all the packets having the same traffic type, identifying VOIP as an example, and Pappu discloses grouping packets into flows having a common traffic type, and then applies a policy for that specific type of traffic to all the packets that have the same traffic type. *See id.* at 16–17 (quoting Ex. 1001, 1:46–55; citing Ex. 1004, 3:4–21; Ex. 1003 ¶ 49). According to Petitioner, “[r]ather than treating all packets the same, Pappu expressly describes that packets grouped together as VOIP traffic would be treated differently than packets grouped together as P2P traffic or online gaming traffic.” *Id.* at 17–18 (quoting Ex. 1004, 3:23–30; citing Ex. 1011 ¶ 16). Petitioner asserts the ’629 Patent and Pappu describe treating sessions and flows in an identical manner, and neither the ’629 Patent nor Pappu teach that packets are treated the same way, as it

would defeat the goals of the '629 Patent and Pappu. *Id.* at 18 (citing Ex. 1011 ¶ 17).

In response to Petitioner's Reply, Patent Owner contends that Petitioner does not address how the '629 Patent might make use of the disclosed data types (i.e., aggregated packet data such as average inter-arrival period and average length). *See* Sur-Reply 17 (citing Reply 19; Ex. 1001, 10:60–64). Patent Owner also argues that “neither the ‘packet size’ nor ‘inter-arrival gap between two packets’ described in *Pappu* constitutes packet-specific information.” *Id.* at 17–18 (citing PO Resp. 8–11); *see id.* at 18 (similar arguments; citing Ex. 1004, 7:42–46; PO Resp. 8–11).

We do not agree with Patent Owner's arguments because they are not commensurate in scope with the claim language. The claim recitations of “session characteristics” and “analyzing grouped packets in a presumed session for a session characteristics,” does not recite or otherwise require: (1) comparing packets or subsets of packets to one another; (2) packet specific information as opposed to aggregated packet data; and (3) treating packets differently. We find that Pappu's behavioral statistics discloses or teaches “session characteristics.”

Patent Owner also argues that there is no identification step in Pappu's process. *See* PO Resp. 26. Patent Owner asserts that the '629 Patent describes a process where a specific service or application is identified after analyzing the session characteristics. *See id.* at 26–27. Patent Owner contends that Pappu applies a pre-established, pre-identified behavioral model to current data. *See id.* at 26. According to Patent Owner, “[i]dentifying the session type is a key difference between managing *flows* and managing *sessions*.” *Id.* at 27 (citing Ex. 2001 ¶ 132). Patent Owner argues that the difference is between identifying a flow as VOIP and

identifying a session as using code type X, or voice session using Skype, as taught by the '629 Patent. *See id.* (citing Ex. 1001, 7:8–16; Ex. 2001 ¶ 133).

We do not agree with Patent Owner's arguments because they are not commensurate in scope with the claim language. The plain language of claim 15 does not recite or require identification of a specific service or application (i.e., code type X, Skype). Claim 15 merely recites: "analyzing said grouped packets . . . for session characteristic[s]," and "*using said session characteristics* to identify a session type" As explained by Petitioner, "Pappu expressly describes that packets grouped together as VOIP traffic would be treated differently than packets grouped together as P2P traffic or online gaming traffic." Reply 17–18 (quoting Ex. 1004, 3:23–30; citing Ex. 1011 ¶ 16).

In summary, after considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches "analyzing said grouped packets of said presumed session for session characteristic[s]," and "using said session characteristics to identify a session type of said presumed session," as recited in claim 15. *See* Ex. 1004, 3:4–30, 6:44–49; 7:21–50, 8:26–30, 8:58–63, 8:66–9:2, 9:39–48, 10:17–27, 14:50–15:5, Fig. 4; Ex. 1003 ¶¶ 46, 49, 105–110; Ex. 1011 ¶¶ 16–18.

e. Summary

For all of the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of claim 15, and, therefore, claim 15 is unpatentable under 35 U.S.C. § 103(a) over Pappu.

3. Analysis of Claim 18

Claim 18, dependent from claim 15, recites “thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said thresholds for said grouping.” Ex. 1001, 13:48–51. Petitioner contends that Pappu discloses the limitations of claim 18 based on Pappu’s disclosures that a flow is a set of packets that are related in some way, and in one embodiment, grouping packets into a flow “if those packets share a sufficient amount of header information.” Pet. 51 (quoting Ex. 1004, 6:15–19; Ex. 1003 ¶ 113). According to Petitioner, a person of ordinary skill in the art “understood that in order to determine whether packets share a sufficient amount of header information, a threshold can be set.” *Id.* (citing Ex. 1003 ¶ 113). Petitioner points out that in one embodiment, Pappu discloses the “threshold that packets are deemed to belong to the same flow if they have the five tuple in common, e.g., if two or more packets have the same source address, the same source port number, the same destination address, the same destination port number, and the same transport layer protocol.” *Id.* at 51–52 (citing Ex. 1004, 6:19–26; Ex. 1003 ¶ 113).

Patent Owner argues, “[b]ecause a binary choice of ‘everything either matches or it doesn’t’ does not constitute a ‘threshold,’ Pappu does not disclose Claim 18.” PO Resp. 28 (citing Ex. 2001 ¶¶ 135–138); *see* Prelim. Resp. 26 (same argument). In reply, Petitioner asserts that the Response repeats verbatim its argument from the Preliminary Response, and does not attempt to address the Board’s finding in the Institution Decision that Pappu discloses or teaches the limitations of claim 18. *See* Reply 20 (citing PO Resp. 27–28; Prelim. Resp. 25–26; Dec. 16–17).

We do not agree with Patent Owner’s arguments, because as explained above in Section II.A.3., we do not adopt Patent Owner’s

proposed construction for “thresholding” or “threshold.” As explained in Section II.A.3., the broadest reasonable interpretation for “thresholding” or “threshold” includes “a basic acceptance criterion.” We find that Pappu’s “a sufficient amount of header information” or the same source address, source port number, destination address, destination port number, and transport layer protocol, (i.e., the five tuple) discloses or teaches “thresholding” or “threshold” in accordance with its broadest reasonable interpretation. *See* Ex. 1004, 6:15–26; Ex. 1003 ¶ 113.

For all of the foregoing reasons, in addition to the reasons discussed above addressing the limitations of independent claim 15, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of claim 18, and, therefore, claim 18 is unpatentable under 35 U.S.C. § 103(a) over Pappu.

4. Analysis of Claim 19

Claim 19, dependent from claim 15, recites “wherein said characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth.” Ex. 1001, 14: 1–3. Petitioner contends that Pappu discloses the limitations of claim 19 based on Pappu’s disclosures of: (1) average packet size, derived by dividing total byte count by total number of packets; (2) average inter-packet gap, derived by averaging the amounts of time that passes between the arrivals of packets; and (3) listing of behavioral statistics, which includes an instantaneous flow rate derived by dividing the size of the most recently arrived packet by the inter-arrival time gap between the two most

recently arrived packets. *See* Pet. 51–52 (quoting Ex. 1004, 7:34–42, 14:57–15:4; citing Ex. 1003 ¶ 114).

In the Institution Decision, we interpreted “said characteristics” as referring to the “traffic packet characteristics,” recited in claim 19, and found that Petitioner’s reliance on Pappu’s average packet size and average inter-arrival period is inconsistent with Petitioner’s reliance on the five-tuple for disclosing “traffic packet characteristics.” *See* Dec. 17. We also agreed with Patent Owner’s Preliminary Response arguments that Pappu does not disclose average bandwidth, and that Pappu discloses average packet length and average inter-arrival period, which are different from the recited “packet length” and “inter-arrival period.” *See id.*

Patent Owner does not present any arguments in its Response addressing claim 19. *See generally* PO Resp. In its Reply, Petitioner argues that the Board overlooked that Pappu discloses inter-arrival period, not just average inter-arrival period. According to Petitioner, “Pappu uses the term ‘inter-packet gap’ and describes that the inter-packet gap can be used to derive an ‘average’ inter-packet gap . . . and that ‘the inter-packet time gap between the two most recently arrived packets’ can be used to derive an instantaneous flow rate.” Reply 24 (citing Ex. 1004, 7:34–42; 14:57–15:4). Petitioner also contends that the Petition identified that the session characteristic recited in claim 15 corresponded to Pappu’s disclosure of behavioral characteristics, including the individual packet characteristic of an inter-packet gap, and the Petition shows that Pappu’s disclosure of “inter-packet gap” corresponds to the limitations of claim 19. *See id.* (citing Pet. 47, 52–53). According to Petitioner, “because Pappu discloses inter-arrival time gap (*inter-arrival period*), the Petition establishes that Pappu discloses the limitations of Claim 19.” *Id.* at 26 (citing Pet. 46, 52–53).

In response to the Reply, Patent Owner argues that “[a]n ‘instantaneous flow rate,’ calculated by dividing the size of the most recently processed packet by the time gap between the two most recently received packets, is not an inter-arrival period.” Sur-Reply 20 (citing Ex. 1004, 7:36–54. According to Patent Owner, “*Pappu* makes no mention of using anything other than the *average* inter-packet gap.” *Id.* Patent Owner also argues that, “even if it were true that ‘session characteristics’ and ‘behavioral characteristics’ could be properly equated, page 47 of the Petition does not, in fact, make any *supported* mention of ‘the individual packet characteristic of an inter-packet gap.’” *Id.* at 20–21 (reproducing Ex. 1004, Fig. 4; citing Ex. 1001, 7:34–42).

We do not agree with Patent Owner’s arguments. As explained above in Section II.A.4., we interpret “said characteristics,” recited in claim 19, as referring to either the “traffic packet characteristics” or the “session characteristics,” of claim 15. Patent Owner’s arguments premised on the recitation of “inter-arrival period” excluding an average inter-arrival period, and requiring direct use of the inter-arrival period are not commensurate in scope with the language of claim 19. The plain language of claim 19 does not exclude indirect use of the “inter-arrival period,” nor does it preclude “average inter-arrival period,” or any other parameter derived from inter-arrival periods. This scope of claim 19 is consistent with the ’629 Patent, which discloses: (1) the session analyzer is configured to use, inter alia, “an inter-arrival period,” “variance of inter-arrival period,” “co-variance of inter-arrival period,” and “a statistical derivative obtained from multi records of inter-arrival period;” (*see* Ex. 1001, 4:22–55); (2) the derivatives may be statistical parameters such as average inter-arrival period (*see id.* at

8:58–65); and (3) “the average bandwidth is the average packet length divided by average inter-arrival period” (*id.* at 7:63–64).

Moreover, the ’629 Patent discloses:

The present embodiments identify and distinguish between different media sessions within IP network traffic using certain packet related elements or characteristics, primarily but not exclusively packet length and packet inter-arrival period. *In practice the methodology may not use these characteristics directly but rather may make use of a range of statistical parameters which are derivatives thereof.*

Ex. 1001, 7:42–49.

We also do not agree with Patent Owner’s argument that “the Petition does not . . . make any *supported* mention of “the individual packet characteristic of an inter-packet gap.”” Sur-Reply 20. Contrary to Patent Owner’s argument, column 7, lines 34–42 of Pappu, quoted by Petitioner at pages 47–48 of the Petition, discloses that the amounts of time that pass between the arrivals of packets (i.e., inter-packet gaps) can be averaged to derive the average inter-packet gap. *See* Pet. 47–48 (quoting Ex. 1004, 7:34–42).

We find that, based on the cited evidence, the limitations of claim 19 are disclosed by Pappu’s following disclosure: (1) session characteristics that include an average inter-arrival period; (2) the inter-arrival time gap between the two most recently arrived packets is used to derive instantaneous flow rate; and (3) amounts of time that pass between arrivals of packets (i.e., inter-packet gaps) can be averaged to derive an average inter-packet gap. *See* Ex. 1004, 7:34–42, 14:57–15:4, Fig. 4; 1003 ¶ 114.

For all of the foregoing reasons, in addition to the reasons discussed above addressing the limitations of independent claim 15, and after having analyzed the entirety of the record and assigning appropriate weight to the

cited supporting evidence, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of claim 19, and, therefore, claim 19 is unpatentable under 35 U.S.C. § 103(a) over Pappu.

5. Analysis of Claims 17 and 20–22

Claim 17 depends from claim 15 and recites, “wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session.” Ex. 1001, 13:44–47. Petitioner asserts that Pappu discloses the limitations of claim 17 based on Pappu’s disclosures of applying actions such as penalizing or rewarding a particular flow by changing the flow’s drop priority, flow type, aggregate class, rerouting packets, etc. to flows that have been identified as having the same flow type. *See* Pet. 49–51 (quoting Ex. 1004, 3:4–30; citing Ex. 1003 ¶¶ 111–112; Ex. 1004, 11:60–13:16). Patent Owner does not specifically dispute Petitioner’s contentions addressing the limitations of claim 17. *See* PO Resp. 28.

Based on Petitioner’s cited evidence, we find that Pappu discloses or teaches the limitations of claim 17. *See* Ex. 1004, 3:4–30, 11:60–13:16; Ex. 1003 ¶¶ 111–112. For these reasons, in addition to the reasons discussed above addressing independent claim 15, and after having analyzed the entirety of the record, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of dependent claim 17, and, therefore, claim 17 is unpatentable under 35 U.S.C. § 103 over Pappu.

Claim 20 depends from claim 15 and recites, “inserting into a header of a respective packet an indication of said presumed session with which

said respective packet has been identified.” Ex. 1001, 14:4–7. Petitioner contends that Pappu discloses the limitations of claim 20 based on Pappu’s disclosure of inserting a code into the header of a packet associated with the flow or each packet belonging to an identified flow, specifically, in relation to the quality of service for a flow, changing the contents of a diffuse code point (DSCP) field of a packet’s header. *See* Pet. 53–54 (quoting Ex. 1004, 11:21–29, 11:63–67; citing Ex. 1003 ¶¶ 115–116). Patent Owner does not specifically dispute Petitioner’s contentions addressing the limitations of claim 20. *See* PO Resp. 28.

We find that, based on Petitioner’s cited evidence, Pappu discloses or teaches the limitations of claim 20. *See* Ex. 1004, 11:21–29, 11:63–67; Ex. 1003 ¶¶ 115–116. For these reasons, in addition to the reasons discussed above addressing independent claim 15, and after having analyzed the entirety of the record, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of dependent claim 20, and, therefore, is unpatentable under 35 U.S.C. § 103 over Pappu.

Claim 21 depends from claim 15 and recites, “obtaining said characteristics belonging to said presumed session from parameter patterns common to said packets.” Ex. 1001, 14:8–10. Petitioner contends that Pappu discloses the limitations of claim 21 based on Pappu’s disclosures of maintaining a set of behavioral statistics for a flow that reflect the empirical behavior of the flow, and, in one embodiment, identifying a flow as representing online gaming traffic when the flow’s packet size is as great as a third threshold value but not greater than a fourth threshold value. *See* Pet. 54–55 (quoting Ex. 1004, 7:21–27, 9:18–21, 10:11–14; citing Ex. 1003

¶¶ 117–119). Patent Owner does not specifically dispute Petitioner’s contentions addressing the limitations of claim 20. *See* PO Resp. 28.

Based on Petitioner’s cited evidence, we find that Pappu discloses or teaches or suggests the limitations of claim 20. *See* Ex. 1004, 7:21–27, 9:18–21, 10:11–14; Ex. 1003 ¶¶ 117–119. For these reasons, in addition to the reasons discussed above addressing independent claim 15, and after having analyzed the entirety of the record, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of dependent claim 21, and, therefore, claim 21 unpatentable under 35 U.S.C. § 103 over Pappu.

Claim 22 depends from claim 15 and recites:

using at least one member of the group consisting of:

- packet length
- inter-arrival period
- variance of inter-arrival period
- variance of length
- covariance of inter-arrival period
- covariance of length
- a statistical derivative obtained from multi records of packet length
- a statistical derivative obtained from multi records of inter-arrival period
- a histogram built of at least one of the following;
 - i. packet length
 - ii. inter-arrival period
 - iii. variance of inter-arrival period
 - iv. variance of length
 - v. covariance of inter-arrival period
 - vi. covariance of length
 - vii. a statistical derivative obtained from multi records of packet length
 - viii. a statistical derivative obtained from multi records of inter-arrival period
- a matrix histogram built of at least one of the following;

- i. packet length
- ii. inter-arrival period
- iii. variance of inter-arrival period
- iv. variance of length
- v. covariance of inter-arrival period
- vi. covariance of length
- vii. a statistical derivative obtained from multi records of packet length
- viii. a statistical derivative obtained from multi records of inter-arrival period.

Ex. 1001, 14:11–43.

Petitioner contends that Pappu discloses the limitations of claim 22 based on Pappu’s disclosures of using header information and behavioral statistics that include packet length and inter-arrival period. *See* Pet. 55–56 (citing Ex. 1004, 7:28–50, 14:57–15:5, Fig. 4; Ex. 1003 ¶ 120); *see also Fresenius USA, Inc. v. Baxter Int’l, Inc.*, 582 F.3d 1288, 1298 (Fed. Cir. 2009) (“the entire element is disclosed by the prior art if one alternative in the Markush group is in the prior art”). Patent Owner does not specifically dispute Petitioner’s contentions addressing the limitations of claim 22. *See* PO Resp. 28.

We find that, based on Petitioner’s cited evidence, Pappu discloses or teaches the limitations of claim 22. *See* Ex. 1004, 7:28–50, 14:57–15:5, Fig. 4; Ex. 1003 ¶ 120. For these reasons, in addition to the reasons discussed above addressing the limitations of independent claim 15, and after having analyzed the entirety of the record, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of dependent claim 22, and, therefore, is unpatentable under 35 U.S.C. § 103 over Pappu.

D. Unpatentability of Claims 15 and 17–22 over Pappu and Peleg

We need not reach Petitioner’s grounds of unpatentability for claims 15 and 17–22 as unpatentable under 35 U.S.C. § 103 over Pappu in combination with Peleg (*see* Pet. 26, 43–45) because we have already determined the preponderance of the evidence demonstrates that claims 15 and 17–22 are unpatentable under 35 U.S.C. § 103 over Pappu alone. *See SZ DJI Tech. Co. Ltd., v. Drone-Control, LLC*, Case IPR2018–00206, slip op. at 36–39 (PTAB May 29, 2019) (Paper 48) (addressing the propriety, in view of *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), of not reaching additional grounds of unpatentability in a final written decision after finding all of the challenged claims unpatentable on a first ground).

III. MOTION TO AMEND

Contingent on the determination that claims 15 and/or 17–22 are unpatentable, Patent Owner requests that we cancel claims 17, 18, and 20–22 of the ’629 Patent and replace these claims with proposed substitute claims 25–29. *See* Mot. Amend 1–2. As discussed above in Section II, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 15 and 17–22 are unpatentable. Accordingly, we address Patent Owners’ Motion to Amend with respect to proposed substitute claims 25–29. *See id.* at 3–7.

In reviewing a motion to amend, we consider whether the motion meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. *See Lectrosonics, Inc. v. Zaxcom, Inc.*, Case IPR2018-01129 (PTAB Feb. 25, 2019) (Paper 15) (precedential). That is, the patent owner must demonstrate the following: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment does

not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the proposed claims are supported in the original disclosure of the patent; and (4) the amendment responds to a ground of unpatentability involved in the trial. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121; *Lectrosonics* at 4–8. The patent owner, however, “does not bear the burden of persuasion to demonstrate the patentability of [the proposed] substitute claims.” *Lectrosonics* at 4 (citing *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017); *Bosch Auto. Serv. Sols. LLC v. Iancu*, 878 F.3d 1027 (Fed. Cir. 2017)). “Rather, as a result of the current state of the law and [U.S. Patent and Trademark Office] rules and guidance, the burden of persuasion will ordinarily lie with the petitioner to show that any proposed substitute claims are unpatentable by a preponderance of the evidence.” *Id.*

A. Reasonable Number of Substitute Claims

We determine that Patent Owner’s proposal to substitute a single claim for each cancelled claim (*see* Ex. 2004) meets the requirement for a reasonable number of substitute claims. *See* 37 C.F.R. § 42.121(a)(3) (establishing a rebuttable presumption that one substitute claim is needed to replace each challenged claim). A table showing the proposed substitute claims and replaced claims is reproduced below:

Original Claim	Substitute Claim
17	25
18	26
20	27
21	28
22	29

See Mot. Amend 2.

B. Proposed Substitute Claims 25–29

Proposed substitute independent claim 25, to replace dependent claim 17, is reproduced below with bracketed text showing deletions, underlined text showing the incorporation of the limitations of independent claim 15, and bolded and underlined text showing Patent Owner’s amendments:

25. [[The method of claim 15]] A method of identifying session type, comprising:
obtaining passing packets of respectively unknown sessions and unknown session types;
obtaining traffic packet characteristics of said passing packets of respectively unknown session types;
comparing said obtained packets with each other using respectively obtained traffic packet characteristics;
grouping together those packets having similar values of said traffic packet characteristics into a presumed session;
analyzing said grouped packets of said presumed session for session characteristics; and
using said session characteristics to identify a session type of said presumed session,
wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information, and
wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the **presumed** session.

Proposed substitute claims 26–29, dependent from proposed substitute claim 25, recite identical limitations as dependent claims 18 and 20–22. *Compare* Ex. 2004, 2–3, *with* Ex. 1001, 13:47–50, 14:1–44.

C. Enlargement of Claim Scope

Patent Owner asserts that proposed substitute claims 25–29 do not enlarge the scope of the originally issued claims 17, 18, and 20–22. *See* Mot. Amend 4. Patent Owner contends that substitute independent claim 25,

includes all of the limitations of claim 17, which has been rewritten in independent form, and includes added narrowing features. *See id.* Patent Owner points out that the narrowing features added to claim 25 are: “the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information.” *Id.* According to Patent Owner, “this amendment narrows the scope of [c]laim 17, and no aspect of [c]laim 17 is broadened.” *Id.* Petitioner does not dispute Patent Owner’s contention that claim 25 does not seek to enlarge the scope of the claims of the ’629 Patent. *See generally* Opp. Mot. Amend.

Based on the record before us, we determine that proposed substitute independent claim 25 meets the requirements of 37 C.F.R. 42.121(a)(2) because it does not remove a feature of claim 17, and because it narrows the scope of claim 17 with additional limitations. *See Lectrosonics* at 6–7. By virtue of their dependency from claim 25, based on the record before us, we determine that proposed substitute claims 26–29 also meet the requirements of 37 C.F.R. 42.121(a)(2).

D. New Matter / § 112 Support

Patent Owner asserts that the narrowing limitations of proposed substitute claim 25 are supported by the original disclosure of the ’510 Application, from which the ’629 Patent issued. *See* Mot. Amend 4–5. Patent Owner contends that “‘wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information’ is supported at least in the following locations [of the ’510 Application]: page 2, lines 12–17; page 5, lines 15–16; page 5, line 27 to page 6, line 27; page 8, line 29 to page 9,

line 6; page 9, lines 22–30; page 10, lines 25–26; and page 11, lines 16–28.”

Id. at 5.⁶

Petitioner contends that Patent Owner fails to meet the requirements of 37 C.F.R. § 42.121 because Patent Owner did not introduce the ’510 Application as an exhibit, and therefore, the ’510 Application is not part of the record. *See* Opp. Mot. Amend 5 (citing 37 C.F.R. §§ 42.63(a), 42.121). In reply, Patent Owner argues that it is irrelevant that the ’510 Application was not an exhibit prior to the filing of the Reply because Petitioner’s Exhibit 1002, which includes select portions of prosecution history of the ’629 Patent, demonstrates that Petitioner had access to the ’510 Application. Reply Opp. Mot. Amend 2. Patent Owner argues, “the ’510 Application is part of the public record of the ’629 Patent at the Patent & Trademark Office, access to which is equally available to Petitioners, Patent Owner, the Board, and the public.” *Id.* With its Reply, Patent Owner submits the entire file history of the ’629 Patent, including the ’510 Application as Exhibit 2015. In response to the Reply, Petitioner argues that Patent Owner’s belated filing of the ’510 Application prejudices Petitioner by forcing Petitioner to respond in a sur-reply which is limited to 12 pages instead of responding in the Opposition which has a 25 page limit. *See* Sur-Reply Opp. Mot. Amend 1–2.

We do not agree that Patent Owner’s failure to file the ’510 Application as an exhibit with its Motion to Amend is fatal to Patent Owner’s Motion to Amend. We do not agree that Patent Owner’s belated filing of Exhibit 2015 prejudiced Petitioner because Petitioner does not

⁶ Patent Owner also contends that U.S Provisional Application No. 60/856,795 provides support at pages 2–3. *See* Mot. Amend 5.

allege actual prejudice. Petitioner's Sur-Reply was shorter than the page limit of 12 pages. Had Petitioner needed additional pages to respond to the belatedly filed Exhibit, Petitioner could have requested additional pages from the panel. *See Lectrosonics* at 9. In the circumstances before us, we determine that Patent Owner's belated filing of Exhibit 2015 is not fatal to Patent Owner's Motion to Amend because Petitioner was not prejudiced and because Petitioner had sufficient opportunity to respond to Exhibit 2015 in its Sur-Reply.

Petitioner also argues that Patent Owner fails to identify support in the original disclosure for all limitations of all of the substitute claims because the Motion to Amend lists citations for only the newly added limitations for proposed substitute claim 25. *See* Opp. Mot. Amend 6 (quoting *Western Digital Corp. v. Spex Techs., Inc.*, Case IPR2018-00082, slip op. at 8 (Apr. 25, 2018) (Paper 13); citing 37 C.F.R. § 42.121; Mot. Amend 5–6). In its Reply, Patent Owner responds, “[t]o the extent any amended claim includes subject matter recited in an originally-filed application, that subject matter provides its own written description support.” Reply Opp. Mot. Amend 2. With its Reply, Patent Owner provides in an appendix additional citations to the ’510 Application for the limitations of proposed substitute claim 25 carried over from original claims 15 and 17. *See id.* at 12. In response to the Reply, Petitioner argues that Patent Owner's failure to identify the written description support of the originally filed disclosure for each proposed substitute claim in the Motion to Amend cannot be cured by attaching an appendix to the Reply to the Motion to Amend. *See* Sur-Reply Opp. Mot. Amend 2. According to Petitioner, “[t]he written description support must be set forth in the motion to amend itself, not in a claim listing included in an appendix.” *Id.* (citing *Lectrosonics* at 8).

Petitioner also complains that the single-spaced appendix attached to the Reply is improper because it would cause the Reply to exceed the 12 page limit if the analysis were properly double-spaced as part of the body. *See id.*

We do not agree that Patent Owner's additional citations to the '510 Application provided in an appendix to the Reply are fatal to Patent Owner's Motion to Amend. Although the appendix to the Reply is technically improper, Petitioner does not allege it has suffered prejudice as a result. Furthermore, Petitioner was afforded sufficient opportunity to respond in its Sur-Reply, and, as discussed below, Petitioner responded substantively to the Reply.

Turning to the citations provided by Patent Owner in the Motion to Amend as support for the proposed substitute claims, Petitioner contends that Patent Owner's Motion to Amend identifies seven string cites to the '510 Application, but the Motion makes no attempt to explain how these citations support the added limitations. *See* Opp. Mot. Amend 6. According to Petitioner,

It is not sufficient that Patent Owner identifies that the original disclosure discloses that traffic packet characteristics can include header information and non-header information. The original disclosure must support the claimed invention, including that header and non-header information is used in each of the "obtaining", "comparing", and "grouping" limitations.

Id. at 7 (quoting *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997)). In its Reply, Patent Owner argues that Petitioner has not alleged, and cannot show, that Patent Owner's citations do not meet the standard of *Lockwood*. *See* Reply Opp. Mot. Amend 3. According to Patent Owner, "Petitioner[] ha[s] provided ***no reason*** why Patent Owner's citations would

leave one of ordinary skill in the art wondering how the citations support the ‘obtaining,’ ‘comparing,’ and ‘grouping’ limitations.” *Id.*

In response to the Reply and the additional citations provided in the appendix, Petitioner contends that Patent Owner argues that each of the comparing, grouping, and obtaining steps of proposed claim 25 use more than packet header information, i.e., packet non-header information. *See* Sur-Reply Opp. Mot. Amend 3 (citing Reply Opp. Mot. Amend 4). According to Petitioner, Patent Owner’s argument means that each of the comparing, grouping, and obtaining steps use header information and something more than header information, but the Appendix does not identify support in the original specification for these recited steps using header information and something more than header information. *See id.*

We do not agree with Petitioner’s contention that proposed substitute claim 25 requires the comparing step to use packet header information and more than packet header information (i.e., packet non-header information). Petitioner’s argument is not commensurate in scope with the claim limitations. Proposed substitute claim 25 does not specify, or otherwise require, comparing said obtained packets with each other using *all* respectively obtained traffic packet characteristics, i.e., “parameters associated with a traffic packet” *and* “more than packet header information.” The scope of “comparing said obtained packets with each other using respectively obtained traffic packet characteristics,” as modified by “wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information,” includes comparing said obtained packets with each other using respectively obtained: (1) “more than packet header information” (i.e., non-header information), (2) “parameters associated with a traffic packet”

(i.e., generic parameters that may include header information, non-header information, etc.), or (3) “more than packet header information” and “parameters associated with a traffic packet.” We find that the ’510 Application discloses comparing packets with each other using, at least: (1) “more than packet header information” or (2) “parameters associated with a traffic packet.” In particular, we find that the “comparing” limitation as modified by the “wherein” clause, recited in proposed substitute claim 25 is supported by the ’510 Application disclosure that thresholding of statistical variations of packet length and packet inter-arrival period “sets a basic criterion for a packet to be considered a part of a media stream, against which each consecutive incoming IP packet is examined,” and marking those packets that meet the acceptance criteria at a high probability of being media session packets. *See* Ex. 2015, 11:23–28; Reply Opp. Mot. Amend 12 (citing Ex. 2015, 11:22–28).

Related to its previous argument, Petitioner contends that none of Patent Owner’s citations provided in the appendix to the Reply discloses “‘comparing said obtained packets with each other’ for any information, let alone header information, and ‘more than header information.’” Sur-Reply 3–4 (citing ’510 Application 7:5–11, 9:22–30, 11:22–33, 12:23–25, 16:3–7 (Ex. 2015)). According to Petitioner, the original disclosure discloses comparing each obtained packet to a threshold, not with each other as required in proposed substitute claim 25. *See id.* at 3–4 (citing ’510 Application 11:22–28). We do not agree with Petitioner’s arguments because the disclosure of comparing incoming IP packets against thresholds of statistical variations of packet length and packet inter-arrival period derived from other previously obtained packets (*see* Ex. 2015, 11:22–28) discloses comparing incoming packets to previously obtained packets by

way of using the thresholds of statistical variations of the previously obtained traffic packet characteristics.

Petitioner also argues that none of Patent Owner's citations provided in the appendix to the Reply discloses "'grouping together those packets having similar values of said traffic characteristics into a presumed session' wherein the traffic packet characteristics include more than header information." Sur-Reply 3–4 (citing '510 Application 7:5–11, 9:22–30, 11:22–33, 12:23–25, 16:3–7 (Ex. 2015)). Petitioner contends that the '510 Application does not disclose grouping based on header information in addition to the external packet characteristics of packet length, inter-arrival periods, or derivatives thereof. *See id.* at 4.

We do not agree with Petitioner's arguments because they are not commensurate in scope with the limitations of proposed substitute claim 25. Proposed substitute claim 25 does not specify, or otherwise require, grouping together those packets having similar values of ***all of*** said traffic packet characteristics, i.e., "parameters associated with a traffic packet" ***and*** "more than packet header information." The scope of "grouping together those packets having similar values of said traffic packet characteristics into a presumed session," as modified by "wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information," includes grouping together those packets having similar values of: (1) "more than packet header information" (i.e., non-header information), (2) "parameters associated with a traffic packet" (i.e., generic parameters that may include header information, non-header information, etc.), or (3) "more than packet header information" and "parameters associated with a traffic packet." We find that the '510 Application discloses grouping together those packets

having, at least, similar values of: (1) “more than packet header information” or (2) “parameters associated with a traffic packet.” In particular, we find that the “grouping” limitation, as modified by the “wherein” clause, recited in proposed substitute claim 25, is supported by the ’510 Application disclosure of assembling the marked media session packets to create media streams that are subsequently analyzed for determining more specific conclusions. *See* Ex. 2015, 11:29–33; Reply Opp. Mot. Amend 12 (citing Ex. 2015, 11:29–33).

We have reviewed Patent Owner’s citations to the ’510 Application for the undisputed limitations of proposed substitute claims 25–29 and agree that proposed substitute claims 25–29 do not add new matter and that the ’510 Application provides sufficient written description and enablement support for these undisputed limitations of proposed substitute claims 25–29.

E. Responding to a Ground of Unpatentability

Patent Owner contends that the proposed substitute claims respond to a ground of unpatentability because claim 25 recites the narrowing limitation of “traffic packet characteristics [that] comprise parameters associated with a traffic packet, the parameters including more than packet header information.” *See* Mot. Amend 5. According to Patent Owner, “[t]he addition of this feature further distinguishes substitute Claim 25 as patentable over the references forming the bases of this IPR, whether taken alone or in combination.” *Id.* at 5–6. Patent Owner contends, “both *Pappu* and *Peleg* describe using **header-only data** for traffic management,” and “[n]either *Pappu* nor *Peleg* disclose *wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information.*” *Id.* at 6.

Based on the entirety of the record, we determine that Patent Owner has sufficiently articulated its position for why the added limitation is responsive to the grounds of unpatentability raised in the Petition. *See* Mot. Amend 5–6.

F. Unpatentability of Proposed Substitute Claims 25–29

Petitioner contends that proposed substitute claims 25–29 are obvious over Pappu alone, or in combination with Peleg as set forth in the Petition, and over Pappu alone, or in combination with Peleg, or in combination with Duffield⁷ as set forth in the Opposition. *See* Opp. Mot. Amend 3. Petitioner presents several positions, dependent on claim scope, asserting unpatentability of the Patent Owner’s proposed substitute claims. *See id.* at 8–25. Specifically, Petitioner contends,

To the extent that the Patent Owner’s proposed amendment requires that the traffic packet characteristics disclosed in Peleg and Pappu include “more than packet header information” but do not require that each of the “obtaining”, “comparing”, and “grouping” limitations requires the use of more than header information, then the Petition sets forth where each of the limitations is found in Ground 1, in view of the fact that both Pappu and Peleg disclose traffic packet characteristics that include “more than packet header information.”

Opp. Mot. Amend 9 (citing Pet. 27–57). Petitioner also asserts,

To the extent the Board considers that the wherein amendment modifies each of the steps of “obtaining”, “comparing” and “grouping” to affirmatively operate on the packet header information and also “more than packet header information,” Pappu in view of Peleg, in further view of Duffield, discloses each of those limitations including by using packet header

⁷ Ex. 1005, US 7,660,248 B1, issued Feb. 9, 2010 (“Duffield”).

information and “more than packet header information,” such as inter-arrival period and instantaneous flow.

Id. at 10.

1. Claim Construction

We construe only those terms that are in controversy, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs.*, 200 F.3d at 803)). As demonstrated in the analysis below, none of the newly added claim terms are in controversy, and therefore no claim constructions are required.

2. Unpatentability of Proposed Substitute Claims 25–29 over Pappu

a. Analysis of Proposed Substitute Claim 25

i. A method of identifying session type

Petitioner contends that Pappu discloses “[a] method of identifying session type,” as recited in the preamble of proposed substitute claim 25. *See* Opp. Mot. Amend 15 (citing Ex. 1004, Abstract, 2:34–44; Ex. 1003 ¶ 91; Ex. 1011 ¶ 21; Pet. 38–39). Petitioner’s contention is based on Pappu’s disclosures of identifying, classifying, and controlling information packet flows in a network, and, specifically, identifying a particular type of traffic, such as VOIP, gaming, streaming, and P2P flows. *See* Pet. 38–39 (quoting Ex. 1004, Abstract, 2:34–44; citing Ex. 1003 ¶¶ 91–92); *see also id.* at 48–49 (addressing “using said session characteristics to identify a session type of said presumed session.”). Apart from the arguments presented in the Response and Sur-Reply, Patent Owner does not separately dispute

Petitioner's contentions addressing this limitation. *See* Reply Opp. Mot. Amend 7.

Based on Petitioner's cited evidence, we find that Pappu discloses or teaches "[a] method of identifying session type," as recited in proposed substitute claim 25. *See* Ex. 1004, Abstract, 2:34–44; Ex. 1003 ¶¶ 91–92; Ex. 1011 ¶ 21).

ii. obtaining passing packets . . .

Petitioner asserts that Pappu discloses "obtaining passing packets of respectively unknown sessions and unknown session types," as recited in proposed substitute claim 25. *See* Opp. Mot. Amend (citing Ex. 1004, 7:4–16; Ex. 1003 ¶ 93; Ex. 1011 ¶ 22; Pet. 39–40). Petitioner bases its assertion on Pappu's disclosure that flow manager ("FM") 210 is "on a line card that is acting as an egress line card (i.e., the line card is receiving packets from an ingress line card and sending packets out to another router)" and "receives and processes a packet that does not match any previously established flow." *See* Pet. 39–40 (quoting Ex. 1004, 6:63–66, 7:4–16; citing Ex. 1003 ¶ 93). Apart from arguments presented in the Response and Sur-Reply, Patent Owner does not separately dispute Petitioner's contentions addressing this limitation. *See* Reply Opp. Mot. Amend 7.

Based on Petitioner's cited evidence, we find that Pappu discloses or teaches "obtaining passing packets of respectively unknown sessions and unknown session types," as recited in proposed substitute claim 25. *See* Ex. 1004, 6:44–49, 6:63–66, 7:3–16, Fig. 2; Ex. 1003 ¶ 93; Ex. 1011 ¶ 22.

iii. obtaining traffic packet characteristics . . .

Petitioner contends that Pappu discloses "obtaining traffic packet characteristics of said passing packets of respectively unknown session

types” as recited in proposed substitute claim 25. *See* Opp. Mot. Amend 16–17. Petitioner bases its contention on Pappu’s disclosure of obtaining non-header packet information, specifically behavioral statistics for a flow such as average inter-packet gap (inter-arrival period), flow rate, and instantaneous flow rate, and disclosure of obtaining header information including the 5-tuple. *See id.* (citing Ex. 1004, 6:17–26, 7:21–24, 7:34–42, 14:57–15:4; Figs. 3–4; Ex. 1003 ¶¶ 78–79, 94; Ex. 1011 ¶ 23; Pet. 31–33, 40).

Patent Owner argues that the “obtaining” limitation uses “more than packet header information.” *See* Reply Opp. Mot. Amend 4. Patent Owner notes that Patent Owner’s Response and Sur-Reply address the “obtaining” limitation. *See id.* at 8. Patent Owner, however, does not present arguments addressing Petitioner’s contention that Pappu discloses obtaining behavioral statistics, such as average inter-packet gap (inter-arrival period), flow rate, and instantaneous flow rate, in addition to obtaining header information. *See id.* at 8; PO Resp. 18–19. For this reason, in addition to the reasons discussed above in Section II.D.2.c., Petitioner has established that Pappu discloses “obtaining traffic packet characteristics of said passing packets of respectively unknown session types.”

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “obtaining traffic packet characteristics of said passing packets of respectively unknown session types,” as recited in proposed substitute claim 25. *See* Ex. 1004, 6:17–26, 7:21–24, 7:34–42, 14:57–15:4; Figs. 3–4; Ex. 1003 ¶¶ 78–79, 94; Ex. 1011 ¶ 23.

*iv. comparing said obtained packets with each other using
respectively obtained traffic packet characteristics*

Petitioner asserts that Pappu discloses “comparing said obtained packets with each other using respectively obtained traffic packet characteristics,” as recited in proposed substitute claim 25. *See* Opp. Mot. Amend 17 (citing Ex. 1004, 6:17–26; Ex. 1003 ¶¶ 97–98; Ex. 1011 ¶ 24; Pet. 41–42). Petitioner argues that to the extent that Patent Owner’s proposed amendment requires the traffic packet characteristics disclosed in the prior art to include “more than packet header information” but does not require the “comparing” limitation to use more than header information, the Petition sets forth where each of the limitations is found, because Pappu discloses traffic packet characteristics that include “more than packet header information.” *See id.* at 9 (citing Pet. 27–57). Specifically, Petitioner asserts that Pappu discloses that flows can be identified and classified based on behavioral statistics of flow rate and inter-arrival period, not just based on packet header information. *See id.* (citing Ex. 1004, 2:41–47, 8:16–25, 14:57–15:4; Ex. 1003 ¶¶ 100, 114). Petitioner’s assertions set forth in the Petition are based on Pappu’s disclosure of grouping packets into a flow if the packets share a sufficient amount of header information, and, in another embodiment, deeming packets to belong to the same flow if two or more packets have the same source address, source port number, destination address, destination port number, and transport layer protocol, i.e., the five-tuple. *See* Pet. 41–42 (quoting Ex 1004, 6:17–26; citing Ex. 1003 ¶ 97). According to Petitioner, a person of ordinary skill in the art “would have understood that determining if packets ‘share a sufficient amount of header information’ and that determining ‘if two or more packets have the same source address, the same source port number, the same destination address,

the same destination port number, and the same transport layer protocol’ are both comparisons of packets/traffic packet characteristics with each other.”

Id. at 42 (citing Ex. 1003 ¶ 98).

Patent Owner argues that the “comparing” limitation uses “more than packet header information.” *See* Reply Opp. Mot. Amend 4. Patent Owner further notes that Patent Owner’s Response and Sur-Reply address the “comparing” limitation. *See id.* at 8.

We do not agree with Patent Owner’s argument because it is not commensurate in scope with the claim language. As explained above in Section III.D., proposed substitute claim 25 does not recite, or otherwise require, comparing said obtained packets with each other using *all* respectively obtained traffic packet characteristics (i.e., “parameters associated with a traffic packet” *and* “more than packet header information”). Nor does proposed substitute claim 25 recite, or otherwise require, comparing said obtained packets with each other using respectively obtained “more than packet header information” (i.e., non-header information) of the traffic packet characteristics. The scope of “comparing said obtained packets with each other using respectively obtained traffic packet characteristics,” as modified by “wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information,” includes comparing said obtained packets with each other using respectively obtained: (1) “more than packet header information” (i.e., non-header information), (2) “parameters associated with a traffic packet” (i.e., generic parameters that may include header information, non-header information, etc.), or (3) “more than packet header information” and “parameters associated with a traffic packet.” Petitioner’s assertion, discussed above,

addresses comparing said obtained packets with each other using respectively obtained “parameters associated with a traffic packet,” which falls within the scope of proposed substitute claim 25.

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “comparing said obtained packets with each other using respectively obtained traffic packet characteristics,” as recited in proposed substitute claim 25. *See* Ex. 1004, 6:17–26; Ex. 1003 ¶¶ 97–98; Ex. 1011 ¶ 24.

v. grouping together those packet having similar values of said traffic packet characteristics into a presumed session

Petitioner contends that Pappu discloses or teaches “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as recited in proposed substitute claim 25. *See* Opp. Mot. Amend 9. Specifically, Petitioner contends that, to the extent that Patent Owner’s proposed amendment requires the traffic packet characteristics disclosed in Pappu to include “more than packet header information” but does not require the “grouping” limitation to use “more than header information,” then the Petition sets forth where each of the limitations is found, because Pappu discloses traffic packet characteristics that include “more than packet header information.” *See id.* (citing Pet. 27–57). Specifically, Petitioner asserts that Pappu discloses that flows can be identified and classified based on behavioral statistics of flow rate and inter-arrival period, not just based on packet header information. *See id.* (citing Ex. 1004, 2:41–47, 8:16–25, 14:57–15:4; Ex. 1003 ¶¶ 100, 114). Petitioner’s assertions set forth in the Petition are based on Pappu’s disclosure of grouping packets into a flow if the packets share a sufficient amount of header information, and, in another embodiment, deeming

packets to belong to the same flow if two or more packets have the same source address, source port number, destination address, destination port number, and transport layer protocol, i.e., the five-tuple. *See* Pet. 42 (quoting Ex 1004, 6:17–26; citing Ex. 1001, 6:8–17 (traffic characteristics include header characteristics such as source address and destination address); Ex. 1003 ¶ 99). Petitioner contends that, “Pappu discloses that this grouping into a flow is not necessarily sufficient to identify the specific session and therefore the grouping is only a *presumed* session.” *Id.* at 43 (emphasis added) (quoting Ex. 1004, 8:16–25 (“[T]he packet’s five tuple alone does not necessarily determine which actions router 102 will apply to that packet. This is because the five tuple lacks the information that categorizes the traffic as being P2P, VOIP, online gaming traffic, or another kind of traffic.”); citing Ex. 1003 ¶ 100). According to Petitioner, “[b]ecause the received packet does not match an existing packet flow, and it is not yet determined what type of flow the packet belongs to, a new flow is ‘presumed’: ‘the packet is assumed to be the first packet of a new flow.’” *Id.* (quoting Ex. 1004, 14:50–51; Ex. 1003 ¶ 101).

In reply, Patent Owner argues that the “grouping” limitation uses “more than packet header information.” *See* Reply Opp. Mot. Amend 4. Patent Owner does not present additional arguments addressing the “grouping” limitation based on the disclosures of Pappu alone. *See id.* at 8–9. Patent Owner notes that Patent Owner’s Response and Sur-Reply address the “grouping” limitation. *See id.* at 8.

We do not agree with Patent Owner’s argument because it is not commensurate in scope with the claim language. As explained above in Section III.D., proposed substitute claim 25 does not recite, or otherwise require, grouping together those packets having similar values of *all of* said

traffic packet characteristics (i.e., parameters associated with a traffic packet **and** more than packet header information). Nor does proposed substitute claim 25 recite, or otherwise require, grouping together those packets having similar values of said “more than packet header information” (i.e., non-header information). The scope of “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as modified by “wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information,” includes grouping together those packets having similar values of: (1) “more than packet header information” (i.e., non-header information), (2) “parameters associated with a traffic packet” (i.e., generic parameters that may include header information, non-header information, etc.), or (3) “more than packet header information” and “parameters associated with a traffic packet.” Petitioner’s contentions, discussed above, address grouping together those packets having similar values of “parameters associated with a traffic packet” which falls within the scope of proposed substitute claim 25.

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “grouping together those packets having similar values of said traffic packet characteristics into a presumed session,” as recited in proposed substitute claim 25. *See* Ex. 1004, 6:17–26, 8:16–25; Ex. 1003 ¶¶ 100–101.

vi. analyzing said grouped packets for session characteristics . . .

Petitioner contends that Pappu discloses “analyzing said grouped packets of said presumed session for session characteristics,” as recited in proposed substitute claim 25. *See* Opp. Mot. Amend 24 (citing Ex. 1004,

7:21–50, 14:50–15:5, Figs. 3–4; Ex. 1003 ¶¶ 105–108; Ex. 1011 ¶ 40).

Petitioner bases its contention on Pappu’s disclosure of creating a flow block including the Flow ID and a set of behavioral statistics for the flow discloses “analyzing said grouped packets of said presumed session for session characteristic.” *See* Pet. 48 (citing Ex. 1004, 7:21–27, 14:50–56, Fig. 4; Ex. 1003 ¶¶ 105–106). According to Petitioner, the behavioral statistics include Total Byte Count, Life Duration, Flow Rate, Number, Average Packet Size, Average Packet Rate, Average Inter-Packet Gap, Moving Average Flow Rate, Instantaneous Flow Rate, and Flow Block Creation Timestamp, and averaging individual packet characteristics including packet size, packet rate, and inter-packet gap. *See id.* at 46–48 (reproducing Ex. 1004, Fig. 4; quoting Ex. 1004, 7:34–42; citing Ex. 1004, 7:28–50; 14:57–15:5; Ex. 1003 ¶¶ 106–107). Petitioner also cites Pappu’s disclosure that flow manager (FM) 210 “keep[s] track of flows, determin[es] what behavior those flows are exhibiting, and appl[ies] user-specified actions to those flows based on those flows’ exhibited behavior.” *Id.* at 48 (quoting Ex. 1004, 6:44–49; Ex. 1003 ¶ 108). Apart from arguments presented in the Patent Owner Response and Sur-Reply, addressed above in Section II.C.2.d., Patent Owner does not separately dispute Petitioner’s contentions addressing this limitation. *See* Reply Opp. Mot. Amend 9.

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “analyzing said grouped packets of said presumed session for session characteristic,” as recited in proposed substitute claim 25. *See* Ex. 1004, 7:21–50; 14:50–15:5, Figs. 3–4; Ex. 1003 ¶¶ 105–108; Ex. 1011 ¶ 40.

vii. using said session characteristics to identify a session type of said presumed session

Petitioner asserts that Pappu discloses “using said session characteristic to identify a session type of said presumed session,” as recited in proposed substitute claim 25. *See* Opp. Mot. Amend 24 (citing Ex. 1004, 8:26–27; 9:39–48, 10:17–27; Ex. 1003 ¶¶ 109–110; Ex. 1011 ¶ 41; Pet. 48–49). Petitioner bases its contention on Pappu’s disclosure that “[t]he type of traffic that a particular flow represents can be estimated from that flow’s behavioral statistics.” *See* Pet. 48–49 (quoting Ex. 1004, 8:26–27; citing Ex. 1003 ¶ 109). According to Petitioner, Pappu discloses determining whether flows are, e.g., “VOIP traffic” or “online gaming traffic.” *See id.* (quoting Ex. 1004, 9:39–48, 10:17–27; citing Ex. 1003 ¶ 110). Apart from arguments presented in the Patent Owner Response and Sur-Reply addressed above in Section II.C.2.d., Patent Owner does not separately dispute Petitioner’s contentions addressing this limitation. *See* Reply Opp. Mot. Amend 10.

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “using said session characteristic to identify a session type of said presumed session,” as recited in proposed substitute claim 25. Ex. 1004, 8:26–27; 9:39–48, 10:17–27; Ex. 1003 ¶¶ 109–110; Ex. 1011 ¶ 41.

viii. wherein the traffic packet characteristics comprise parameters associated with a traffic packet, . . . including more than packet header information

Petitioner asserts that Pappu discloses “that flows can be identified and classified based on observed behavioral characteristics, not just based on packet header information.” Opp. Mot. Amend 9 (quoting Ex. 1004,

2:41–47; citing Ex. 1004, 8:16–25; Ex. 1003 ¶ 100); *see id.* at 25 (citing Ex. 1011 ¶ 42). Petitioner asserts that Pappu discloses flow rate and inter-arrival period as behavioral characteristics. *See id.* (citing Ex 1004, 14:57–15:4; Ex. 1003 ¶ 114). Apart from arguments presented in the Patent Owner Response and Sur-Reply, and those arguments already addressed in Section III.F.2.iii through III.F.2.iv., Patent Owner does not separately dispute Petitioner’s contentions addressing this limitation. *See Reply Opp. Mot. Amend 10.*

After considering and weighing the cited supporting evidence, we find that Pappu discloses or teaches “wherein the traffic packet characteristics comprise parameters associated with a traffic packet, the parameters including more than packet header information,” as recited in proposed substitute claim 25. *See* Ex. 1004, 2:41–47; 8:16–25, 14:57–15:4; Ex. 1003 ¶¶ 100, 114; Ex. 1011 ¶ 42).

ix. wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the presumed session.

Petitioner asserts that Pappu discloses “wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session,” as recited in proposed substitute claim 25. *See Opp. Mot. Amend 25* (citing Ex. 1004, 3:4–30; 11:60–13:16; Ex. 1003 ¶¶ 111–112; Ex. 1011 ¶ 43; Pet. 49–51). Petitioner’s assertion is based on Pappu’s disclosures of applying actions such as penalizing or rewarding a particular flow by changing the flow’s drop priority, flow type, aggregate class, rerouting packets, etc. to flows that have been identified as having the same flow type. *See* Pet. 49–51 (quoting Ex. 1004, 3:4–30; citing Ex. 1003 ¶¶ 111–112; Ex. 1004, 11:60–13:16).

Apart from arguments presented in the Patent Owner Response and Sur-Reply, Patent Owner does not separately dispute Petitioner's contentions addressing this limitation. *See* Reply Opp. Mot. Amend 10.

Based on Petitioner's cited evidence, we find that Pappu discloses or teaches "wherein said identifying a session type is followed by at least one of the group comprising: providing provisioning and providing control actions to the session," as recited in proposed substitute claim 25. *See* Ex. 1004, 3:4–30; 11:60–13:16; Ex. 1003 ¶¶ 111–112; Ex. 1011 ¶ 43.

x. Summary

For all of the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of proposed substitute claim 25, and, therefore, proposed substitute claim 25 is unpatentable under 35 U.S.C. § 103(a) over Pappu.

b. Analysis of Proposed Substitute Claims 26–29

Petitioner asserts that the Petition demonstrates that Pappu describes all of the limitations of proposed substitute claims 26–29, which correspond to dependent claims 18 and 20–22. *See* Opp. Mot. Amend 25 (citing Pet. 51–55; Ex. 1011 ¶ 44). Apart from arguments presented in the Patent Owner Response and Sur-Reply, Patent Owner does not separately dispute Petitioner's contentions addressing these proposed substitute dependent claims. *See* Reply Opp. Mot. Amend 10–11. For the same reasons as those discussed above in Sections II.D.3. and II.D.5. addressing dependent claims 18 and 20–22, in addition to the reasons discussed above addressing proposed substitute claim 25, and after having analyzed the entirety of the

record, we determine Petitioner has established by a preponderance of the evidence that Pappu discloses or teaches each and every limitation of proposed substitute claims 26–29, and, therefore, claims 26–29 are unpatentable under 35 U.S.C. § 103 over Pappu.

3. Additional Grounds of Unpatentability

We do not reach Petitioner’s additional grounds of unpatentability for proposed substitute claims 25–29 as are unpatentable under 35 U.S.C. § 103 over Pappu in combination with Peleg, and over Pappu in combination with Duffield (*see* Opp. Mot. Amend 8–25), because we determine that proposed substitute claims 25–29 are unpatentable under 35 U.S.C. § 103 over Pappu alone. *See e.g., SZ DJI Tech. Co. Ltd., v. Drone-Control, LLC*, Case IPR2018–00206, slip op. at 43 (PTAB May 29, 2019) (Paper 48) (declining to reach Petitioner’s arguments regarding new matter after finding proposed substitute claims unpatentable over the prior art; citing *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) for finding an agency has discretion to reach a decision based on a single dispositive issue because doing so can save the parties, the agency, and the reviewing court unnecessary cost and effort, and can greatly ease the burden on the agency faced with a proceeding involving numerous complex issues and rigid statutory time limits); *id.* at 51–52 (declining to reach Petitioner’s additional ground of unpatentability over Thornberg ’983 and Karem after determining that proposed substitute claim 24 was unpatentable over Thornberg ’983 alone); *Parrot S.A., v. QFO Labs, Inc.*, Case IPR2016-01559, slip op. at 69 (PTAB Feb. 15, 2018) (Paper 55) (declining to reach Petitioner’s additional grounds of unpatentability over the prior art); *Kingston Tech. Co. Inc., v. Polaris Innovations Ltd.*, Case IPR2016-01622, slip op. at 23 n.8 (PTAB

Feb. 5, 2018) (Paper 35) (declining to reach Petitioner's additional grounds of unpatentability over the prior art). For this same reason, we also do not reach Petitioner's arguments (*see* Opp. Mot. Amend 3, 7–8) that proposed substitute claims 25–29 are unpatentable under 35 U.S.C. § 112, 2nd paragraph as indefinite.

IV. PETITIONER'S MOTION TO EXCLUDE EVIDENCE

Petitioner moves to exclude Exhibits 2006, 2007, 2009, 2011, 2012, 2014, 2016, and 2017 under Rules 401–403, 801, 802, and 901 of the Federal Rules of Evidence (FRE). *See* Mot. Excl. 2–5. Patent Owner opposes the Motion. *See* Opp. Mot. Excl.

It is unnecessary to resolve this evidentiary dispute because we have determined that Petitioner prevails even when considering Exhibits 2006, 2007, 2009, 2011, 2012, 2014, 2016, and 2017. Thus, we dismiss as moot Petitioner's Motion to Exclude Exhibits 2006, 2007, 2009, 2011, 2012, 2014, 2016, and 2017.

V. CONCLUSION

For the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has established that, by a preponderance of the evidence, claims 15 and 17–22 of the '629 Patent are unpatentable. In addition, for the foregoing reasons, and after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has established that, by a preponderance of the evidence, proposed substitute claims 25–29 are unpatentable, and, therefore, deny Patent Owner's Motion to Amend.

VI. ORDER

Accordingly, it is

ORDERED that claims 15 and 17–22 are unpatentable under 35 U.S.C. § 103 over Pappu;

FURTHER ORDERED that Patent Owner’s Motion to Amend is *denied*;

FURTHER ORDERED that Petitioner’s Motion to Exclude Exhibits 2006, 2007, 2009, 2011, 2012, 2014, 2016, and 2017 is *dismissed* as moot; 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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