

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Palo Alto Networks, Inc.,
Fortinet, Inc. and
WatchGuard Technologies, Inc.
Petitioners

v.

Selective Signals, LLC
Patent Owner

IPR2018-00594
PATENT 8,111,629

**PATENT OWNER RESPONSE TO PETITION
PURSUANT TO 37 C.F.R. § 42.120(a)**

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List of Exhibits

Exhibit No.	Description
1001	U.S. Patent No. 8,111,629 (“the ’629 Patent”)
1002	Select portions of the prosecution history of the ’629 Patent
1003	Declaration of Petitioner’s Expert Dr. Samuel H. Russ
1004	U.S. Patent No. 8,085,775 (“ <i>Pappu</i> ”)
1006	U.S. Patent App. Pub. No. 2006/0262789 (“ <i>Peleg</i> ”)

Exhibit No.	Description
2001	Declaration of Dr. Gabi Nakibly
2002	Excerpts from “Palo Alto Networks Firewall Session Overview,” available at https://live.paloaltonetworks.com/t5/Learning-Articles/Palo-Alto-Networks-Firewall-Session-Overview/tap/55633 (last visited May 16, 2018).
2003	Select portions of the prosecution history of the ’629 Patent
2004	Appendix to Patent Owner’s Motion to Amend
2005	Transcript of November 12, 2018 Deposition of Dr. Samuel H. Russ.

I. INTRODUCTION AND SUMMARY OF ARGUMENT

Pursuant to 35 U.S.C. § 316 and 37 C.F.R. § 42.120(a), Selective Signals, LLC (“Patent Owner”) submits this Response to the Petition for *Inter Partes* Review (“the Petition”) of U.S. Patent No. 8,111,629 (“the ’629 Patent”) filed by Palo Alto Networks, Inc., Fortinet, Inc., and WatchGuard Technologies, Inc. (“Petitioner”).

In view of the reasons presented herein, the Petition should be denied in its entirety as failing to meet the burden of proving that at least one challenged claim is unpatentable. The Petition challenges one independent claim—Claim 15—and six claims dependent on Claim 15. Petitioner’s cited art does not disclose at least four limitations of Claim 15, each of which recites “traffic packet characteristics” and/or a “session” limitation: (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*, (3) grouping together those packets having similar values of said *traffic packet characteristics* into a presumed *session*, and (4) analyzing said grouped packets of said presumed *session* for *session characteristic*. EX1001, 13:27–40.

Petitioner’s challenge fails at least because Petitioner’s cited art does not disclose “analyzing said grouped packets of said presumed session for session characteristics.” Specifically, Petitioner’s cited art does not disclose analyzing packets for “session characteristics.” As detailed in Section III.A below, a “session”

is made up of *multiple flows*. In a session, the multiple flows may be treated differently. The constituent packets of those flows may be treated differently. Thus, in order to analyze grouped packets of a presumed session for “session characteristics” a system has to analyze grouped packets for characteristics that can be used to differentiate packets across the session. Petitioner’s cited art—*Pappu*—only discloses the use of certain “behavioral statistics.” These “behavioral statistics,” according to *Pappu* and Petitioners’ expert, identify a “policy” that is applied to *every packet in a flow*. That is, *Pappu* explicitly only considers characteristics applicable to policies that can be applied to every packet indiscriminately. Thus, the “observed characteristics” pointed to by Petitioner fails to disclose or suggest the “session characteristics” recited in the challenged independent claim.

Further, the Petition fails because Petitioner’s cited art does not disclose or suggest either “traffic packet characteristics” or the “session” limitations. Petitioner’s primary reference (*Pappu*) teaches management of “flows”—sets of packets grouped solely on the basis of packet header information. *See e.g.*, EX1004, 5:48–67. *Pappu*’s flows fail to disclose or suggest multiple limitations of Claim 15. Packet grouping based solely on packet header information is antithetical to the disclosure of the ’629 Patent and redundant of the prior art expressly distinguished by the ’629 Patent. EX2001, ¶¶ 24, 29, 32–42, 96. Specifically, flows that group packets solely on the basis of only packet header information fail to disclose or

suggest the “traffic packet characteristics” limitation of Claim 15, which requires ***more than packet header information*** as properly construed.

Still further, *Pappu*’s “flows” fail to teach “sessions.” Sessions may include multiple flows. Sessions may also identify a *user application* for the session, which a flow cannot do. *Id.* at ¶¶ 23, 113, 131, 133. Flows and sessions are implemented and managed at different layers of a network. *Id.* at ¶¶ 86–87. *Pappu*’s flows, therefore, fail to disclose or suggest the various “session” limitations of Claim 15. Petitioner fails to satisfy the All Elements Rule because its cited art fails to disclose at least four elements of the only challenged independent claim (Claim 15), as detailed below. *Id.* at ¶¶ 70–84, 97–134.

The Petition also fails because Petitioner’s cited combination of references is improper: the primary reference (*Pappu*) teaches away from such a combination, neither reference teaches sessions or traffic packet characteristics, and the combination does not disclose each and every limitation. *See* Section III.G, *infra*; EX2001, ¶¶ 146–66. Such an approach invites reversible error and should be rejected outright.

II. THE ’629 PATENT

The ’629 Patent relates generally to “allocating, restricting or refusing communication resources to media ***sessions*** in accordance with individual session or session type.” EX1001, Abstract (emphasis added). The challenged claims of the

'629 Patent are methods for identifying *session* types using *traffic pattern characteristics* that require ***more than simply the header information*** of passing packets. *See* Section III.A *infra*.

The '629 Patent recognized the need for better methods of managing IP sessions: “It is desirable to identify packets as belonging to a session to group the succession of IP packets and also to identify a particular application or type that the session belongs to in order to apply provisioning, quality of service, and control actions to the session” EX1001, 1:46–50.

The '629 Patent identified specific flaws in other approaches to IP traffic management. Specifically, the '629 Patent identified “traditional technologies” in two categories: (1) approaches using header-only information, and (2) approaches using packet-content inspection. *Id.* at 2:4–20. The former is deemed “simplistic” and insufficient; the latter cumbersome and resource-intensive. *Id.* at 2:8–36.

In response to these deficiencies, the '629 Patent describes systems and methods for analyzing IP traffic sessions that are more thorough (and thus more useful) than header-only analysis yet less cumbersome and resource-intensive than packet content analysis. *E.g., id.* at 6:8–22, 6:31–42, 7:3–16, 7:42–8:27; EX2001, ¶ 25. The challenged claims use “traffic pattern characteristics”—information that includes **more than header-only data**—for *session* management. EX2001, ¶¶ 43–43.

III. NO REASONABLE LIKELIHOOD THAT ANY CHALLENGED CLAIM IS UNPATENTABLE

The Petition presents a single ground of unpatentability: Petitioner alleges Claims 15 and 17–22 are obvious under 35 U.S.C. § 103 over U.S. Pat. No. 8,085,775 to Pappu et al. (“*Pappu*”) in view of U.S. Pat. App. Pub. No. 2006/0262789 to Peleg et al. (“*Peleg*”).¹ Pet. at 27, 38–56.

Petitioner’s stated ground fails because the cited art does not disclose each and every element of any of the challenged claims and because the proposed combination is improper. First, *Pappu*—upon which Petitioner solely relies for all but one element of the one challenged independent claim—does not disclose “analyzing said grouped packets of said presumed session for session characteristics” because *Pappu* does not disclose the recited “session characteristics.” According to Petitioner, *Pappu* discloses the use of “behavioral statistics” to identify a policy that is applied *in the same way to every packet in a flow*. In *Pappu*, every packet is treated to the same policy. A “session,” by contrast, includes multiple flows, and may require **different treatment of the different flows**. Thus, any policy that treats all packets the same is inapposite to session management. “Session characteristics” therefore require packet characteristics that

¹ Patent Owner does not concede that either *Pappu* or *Peleg* is prior art to the ’629 Patent.

enable the *management of a session rather than management of a flow*. See Section III.A, *infra*.

Next, *Pappu* does not disclose the claimed “traffic pattern characteristics,” which require **more than packet header information**, at least because *Pappu* teaches **only the use of header information** to identify packets in a flow. EX1004, 5:48–67; EX2001, ¶¶ 67–68 (emphasis added). The ’629 Patent explicitly teaches the use of *more than header-only information* to identify packets in a **session**.

Finally, *Pappu* also does not teach session management, and thus *Pappu* does not disclose the claimed “session types,” “session characteristics,” and “presumed session” limitations. Instead, *Pappu* teaches IP traffic *flow* management. *Pappu*’s “flow” is a set of packets uniquely identified by their “five tuple” (i.e., layer-3 and layer-4 packet header information). EX2001, ¶ 67. A session is a set of packets that relates to an application-level (i.e., layer-7), bidirectional communication. *Id.* at ¶ 87. A session’s packets may belong to multiple flows. *Id.* A flow may include packets from multiple sessions. *Id.* As Petitioner concedes, **flow management (at layers 3 and 4) is therefore insufficient to disclose session management (at layer 7)**. Further, the combination of *Pappu* and *Peleg* does not remedy this deficiency because neither *Pappu* nor *Peleg* teach or suggest managing sessions, including differentiating between user application types. *Id.* at 159–64.

Petitioner fails to establish that its cited references teach or suggest all elements of the challenged claims. Petitioner's art does not disclose the "session" limitations, relying on art that teaches only "flows," or the "traffic pattern characteristics" limitations, which require more than packet header information. Petitioner has therefore failed to meet the burden of proof to establish they are entitled to their requested relief. 37 C.F.R. § 42.108(c). Thus, the Board should reject the Petition.

A. Pappu Does Not Disclose "Analyzing said Grouped Packets of said Presumed Session for Session Characteristics."

Petitioner relies solely on *Pappu* as disclosing "analyzing said grouped packets of said presumed session for session characteristics," as recited in independent Claim 15. As a result of *Pappu*'s focus on flow management (as opposed to session management), *Pappu* does not disclose this limitation.

Petitioner argues "obtaining behavioral statistics (*session characteristics*) of passing packets of the previously unknown flow (*presumed session*)" discloses this limitation. Pet. at 46 (emphasis in original). Petitioner then concludes that "grouped packets are analyzed by the flow manager to determine what behaviors those flows are exhibiting." Pet. at 48. This argument glosses over the fact that *Pappu* is devoted only to *flow* behaviors rather than *session* characteristics.

Analyzing 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. EX2001, ¶ 115. A session may treat packets differently based on the user application needed. *Id.* at ¶¶ 91, 109. *Pappu* teaches only statistics that may be useful in managing flows in which **every packet is treated the same** (e.g., averages of behavioral statistics across packets in a flow). *Id.* at ¶ 109.

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 ¶ 110. Specifically, *Pappu*'s behavioral statistics aggregate packet data and then use that aggregated data to analyze a flow. EX1004, 6:44–49; EX2001, ¶ 111–12. *Pappu* compares the aggregated data to a predefined "policy." *E.g.*, EX1004, 7:60–67. For example, *Pappu* describes a "VOIP policy, which specifies criteria that flows representing VOIP traffic tend to satisfy." *Id.* at 9:28–48. In analyzing a group of packets, the VOIP policy "is applied to UDP flows, to determine whether those UDP flows represent VOIP traffic." *Id.* The comparison in this analysis is between *statistics for the flow* and the policy's predetermined thresholds: "the flow's average bit rate needs to be lower than 100 Kbps, the flow's life duration needs to be greater than 10 seconds, and the flow's average packet size needs to be less than 230 bytes." *Id.* *Pappu* treats all packets in the flow the same. *Id.*; EX2001, ¶ 114. *Pappu*'s data aggregation *loses* the packet-specific data. EX2001, ¶ 116. By losing the packet-specific data, *Pappu* is unable to compare individual packets to one another once it has identified a flow. EX1004, 6:44–49,

7:34–42; EX2001, ¶ 177. Thus, *Pappu*’s “behavioral statistics” do not disclose or suggest “session characteristics.” EX2001, ¶ 125.

Petitioner relies on three of *Pappu*’s “behavioral statistics:” (1) an average packet size; (2) an average “inter packet gap;” and (3) a “moving average flow rate.” Pet. at 47–48; EX1004 6:44–49, 7:34–42. All of these “behavioral statistics” rely on *averages of packets that have already been assigned to the same flow*, thus *losing* packet-specific information. EX2001, ¶¶ 118–19. Packet aggregate data cannot be used effectively to compare individual packets or subsets of packets to one another due to the loss of packet-specific information. *Id.* at ¶ 120. Thus, in analyzing packets for *session* characteristics, the use of these averages is limited. *Id.*

For example, *Pappu*’s calculated averages are only valid within the context of a single flow. There is no disclosure of comparing the parameters of multiple packets *across flows*, as would be needed for managing a session that includes multiple flows. *Id.* at 121. The contrast is clear. The ’629 Patent discloses **comparing parameters associated with one packet with parameters associated with another packet**. *E.g.*, EX1001, 8:47–50. *Pappu* teaches **comparing the “average” to a predefined policy**. EX1004, 9:28–48; EX2001, ¶¶ 49–51.

Petitioner’s expert agrees that *Pappu* only manages **packets** by subjecting **all packets to the same policies**:

Q. [Step 306 of Figure 3 of *Pappu*] says, “FOR EACH POLICY THAT THE FLOWS BEHAVIORAL STATISTICS SATISFY, APPLY,

RELATIVE TO A PACKET BELONGING TO THE FLOW, ACTIONS THAT ARE ASSOCIATED WITH THAT POLICY.” Do you see that?

A. I see.

Q. Does that mean anything to you in terms of how -- with the issue we've been talking about, whether packets are treated according to the policies for the flow?

A. Well, I think at most it discloses that Figure 3, 306 actions are applied to a packet belonging to the flow, and 306 doesn't say one way or the other if that's every single packet or not, but even if one assumes that it did apply to every single packet, that's just one embodiment in Pappu and there may be others.

Q. Sitting here right now, are you aware of any embodiment in Pappu in which a given packet of a flow is not treated according to the policies for that flow as they exist at the time?

A. Sitting here at the moment, I am not, other than the ones I talked about that result in a packet-specific behavior.

Q. To be clear, that was how [packets] were treated differently according to the policy of the flow; is that right?

A. Yes.

Q. [. . .] So my question is not whether the application of a policy might lead to a different action with respect to two packets within a flow. My question is are you aware of any embodiment in which a given packet of a flow is simply not treated at all according to the policies of the flow?

A. Not at the moment.

EX2005 at 54:4–56:2.

Since *Pappu*'s "behavioral characteristics" cannot be used to identify a policy that can treat packets differently, *Pappu*'s "behavioral characteristics" are not useful in managing sessions. In a session, which contains multiple flows, packets may need to be treated differently. If a policy cannot treat those packets differently, the policy is not useful in managing a session. *Peleg*'s "behavioral characteristics" are only used in establishing policies that are applied indiscriminately to every packet. **These "behavioral characteristics" are therefore not "session characteristics."** EX2001, ¶¶ 49–50, 123. Thus, *Pappu* does not disclose "analyzing said grouped packets of said presumed session for *session characteristics*" as recited in independent Claim 15. See EX1001, 13:37–38 (emphasis added); EX2001, ¶ 125.

B. Claim Construction: "Traffic Packet Characteristics"

Independent Claim 15 recites, among other limitations, "obtaining *traffic packet characteristics* of said passing packets of respectively unknown session types." EX1001, 13:29–30 (emphasis added). Claim terms are given their broadest reasonable interpretation consistent with their plain meaning in light of the specification. 37 C.F.R. § 42.100(b). The explicit language of the claims and specification of the '629 Patent references "traffic packet characteristics" for grouping packets into sessions.

The '629 Patent explicitly discounts the use of (and therefore teaches away from) relying only on packet header information in analyzing IP traffic:

The traditional technologies for analyzing and identifying IP traffic (including IP media sessions) include packet header analysis. Packets whose headers indicate the same destination may be assumed to belong to the same session.

Packet header analysis is however simplistic. The same user may be running several different sessions simultaneously and ***mere packet header analysis may not be able to distinguish between them.***

EX1001, 2:4–11 (emphasis added).

The '629 Patent teaches the use of traffic packet characteristics rather than only packet header information. The '629 Patent defines traffic packet characteristics as ***more than packet header information.*** *E.g.*, EX1001, 6:8–22 (emphasis added). Specifically, the '629 Patent describes traffic packet characteristics as “parameters inherent to packet[] traffic” that include “*features such as packet length, inter-arrival period, bandwidth and statistical and other derivations thereof as well as certain header characteristics such as source and destination address.*” EX1001, 6:12–19 (emphasis added). Packet length and inter-arrival period are not found in the packet header. EX2001, ¶ 36. Thus, the '629 Patent defines “traffic packet characteristics” as requiring (see Claim 15 claim construction below) “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.” *Id.* at ¶ 43.

The specification of the ’629 Patent supports this construction. For example, the various components of the systems and methods disclosed in the ’629 Patent make use of more than packet header information in analyzing traffic packets. Specifically, the ’629 Patent teaches a “packet characteristic extraction unit” that obtains “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 6:45–55. Similarly, 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. As explained above, packet length and inter-arrival period are not found in the packet header. EX2001, ¶ 36.

The methods disclosed in the ’629 Patent also rely on such non-header information (e.g., packet length, inter-arrival time, etc.). EX1001, 6:12–19. For example, the “algorithm expects the two parameters of packet length and packet inter-arrival period to meet certain thresholds if indeed the packets belong to the same session.” *Id.* at 7:58–60. Further, 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.” *Id.* at 8:1–9. The above-

cited language of the '629 Patent specification therefore supports Patent Owner's proffered construction that traffic packet characteristics require "parameters associated with a traffic packet, the parameters including more than packet header information."

Other references to "traffic packet characteristics" or "traffic characteristics" in the '629 Patent also support Patent Owner's proffered construction. For example, the '629 Patent states: "In an embodiment, the traffic characteristics comprise at least one member of the group consisting of packet length, inter-arrival period, and average bandwidth." EX1001, 4:6–9. Additionally, the laundry list of parameters considered by the session analyzer include statistics that cannot come from a packet header such as variance of inter-arrival period, variance of length, etc. *Id.* at 4:22–55.

The file history of the '629 Patent is also consistent with Patent Owner's proffered construction. For example, in the March 7, 2011 Response to Office Action, Applicant stated: "Tayyar [the Examiner's cited art] does *not* have extracted packet traffic characteristics since there is no evidence that the classifier ever extracts such data" EX2003 at p. 37 (emphasis in original). The "data" Tayyar uses is the "trivial[] . . . identification in the packet header (usually port number)." *Id.* at p. 36.

Finally, the '629 Patent states: “Traffic characteristics . . . include[] 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.” EX1001, 6:8–19. The '629 Patent, therefore, explicitly contemplates traffic packet characteristics that include more than packet header information and exclude packet payload content. EX2001, ¶ 42.

Under 37 C.F.R. § 42.100(b), Patent Owner therefore submits that “traffic packet characteristics” is properly 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.” EX2001, ¶ 43. Under this construction, it is sufficient for the purposes of this Response that “traffic packet characteristics” include *more than* packet header information.

Petitioner offers no explicit claim constructions, Pet. at 20–21, but Petitioner’s analysis of the challenged claims relies on an incorrect construction of “traffic packet characteristics.” In particular, Petitioner alleges that disclosure of “certain header information” discloses “traffic packet characteristics.” *Id.* at 40. The “certain header information” on which Petitioner relies is a “five tuple” consisting

of data from a packet header. EX2001, ¶ 64. The explicit language of the '629 Patent (and the proper construction of packet characteristics as requiring *more than* packet header information) contradicts this position.

While Petitioner points to certain language in the '629 Patent that “‘traffic packet characteristics’ include source and destination addresses,” Pet. at 40, Petitioner ignores other portions of the '629 Patent that clearly demonstrate that traffic packet characteristics requires *more than simply the header information* of source and destination addresses. EX1001, 6:12–19.

Therefore, as explained above, the broadest reasonable interpretation of “traffic packet characteristics,” when read in light of the specification (and in view of the file history) is “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.” EX2001, ¶ 43.

C. *Pappu* Does Not Disclose *At Least Three Other* Elements of Independent Claim 15.

Petitioner’s sole ground relies exclusively on *Pappu* for five of the six elements of independent Claim 15, the only challenged independent claim.

1. *Pappu* Does Not Disclose Any of the “Traffic Packet Characteristics” Limitations.

Among other limitations, independent Claim 15 recites “traffic packet characteristics.” EX1001, 13:26–40. Petitioner argues *Pappu* alone discloses this limitation, relying exclusively on *Pappu*’s use of header-only information (i.e., the “five tuple”) and a misunderstanding of the term “traffic packet characteristics.” Pet. at 40–41, 41–42, 42–43.

Petitioner’s sole support for its assertion that *Pappu* discloses “traffic packet characteristics” is *Pappu*’s use of a “five tuple” (i.e., packet header information) in routing IP packets. *See e.g.*, Pet. at 40 (citing EX1004, 6:17–26). As detailed above, the recited term “traffic packet characteristics,” as properly construed, requires *more than* packet header information. *See* Section III.A *supra*. In fact, the ’629 Patent explicitly distinguishes the use of header-only information as belonging to the prior art. EX1001, 2:8–11 (“Packet header analysis is however simplistic.”).

Pappu groups packets into flows based solely on the “five tuple.” The five tuple is a group of header-only data that consists of: source address, source port number, destination address, destination port number, and an indication of the transport layer protocol to be used. EX1004, 5:48–66. *Pappu* groups packets into flows “if they have the five tuple in common.” *Id.* at 6:13–22. *Pappu* makes a decision on how to group packets based on that five tuple alone. *See id.* at 7:16–19 (“When FM 210 creates a new flow block, FM 210 stores, in that flow block, criteria

(e.g., a “five tuple” that information in a packet (e.g., header information) needs to satisfy in order to be deemed to belong to that flow”). EX2001, ¶ 67.

Because *Pappu* only teaches using header-only information (i.e., the five tuple), *Pappu* does not disclose parameters associated with a traffic packet, the parameters including *more than packet header information*. *Id.* at ¶ 43. As detailed below, Claim 15 recites “traffic packet characteristics” in three separate limitations: (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. Therefore, *Pappu* fails to disclose or suggest at least these three limitations of Claim 15 and the Petition should therefore be denied.

a. *Pappu* Does Not Disclose “Obtaining Traffic Packet Characteristics of Said Passing Packets of Respectively Unknown Session Types.”

Among other limitations, independent Claim 15 recites “obtaining traffic packet characteristics of said passing packets of respectively unknown session types.” EX1001, 13:29–30. As detailed above, “traffic packet characteristics” is properly construed as “parameters associated with a traffic packet, the parameters including more than packet header information.” Petitioner relies solely on *Pappu* obtaining *only the five tuple* (i.e., only packet header data) from passing packets.

Pet. at 40–41. Thus, *Pappu* fails to disclose “obtaining *traffic packet characteristics* of said passing packets of respectively unknown session types,” as recited in independent Claim 15. *See* EX1001, 13:29–30 (emphasis added); EX2001, ¶¶ 70–74. This claim element is completely missing from *Pappu*.

b. *Pappu* Does Not Disclose “Comparing Said Obtained Packets With Each Other Using Respectively Obtained Traffic Packet Characteristics.”

Among other limitations, independent Claim 15 recites “comparing said obtained packets with each other using respectively obtained traffic packet characteristics.” EX1001, 13:31–32. As detailed above, “traffic packet characteristics” is properly construed as “parameters associated with a traffic packet, the parameters including more than packet header information.” Petitioner relies solely on *Pappu*’s comparison of packets with each other using *only the five tuple* (i.e., only packet header data). Pet. at 41–42. Thus, *Pappu* fails to disclose “comparing said obtained packets with each other using respectively obtained *traffic packet characteristics*,” which require more than packet header information, as recited in independent Claim 15. *See* EX1001, 13:31–32 (emphasis added); EX2001, ¶¶ 75–79. This claim element is completely missing from *Pappu*.

c. *Pappu* Does Not Disclose “Grouping Together Those Packets Having Similar Values of Said Traffic Packet Characteristics into a Presumed Session.”

Among other limitations, independent Claim 15 recites “grouping together those packets having similar values of said traffic packet characteristics into a presumed session.” EX1001, 33–35. As detailed above, “traffic packet characteristics” is properly construed as parameters associated with a traffic packet, the parameters including *more* than packet header information. Petitioner argues *Pappu* alone discloses this limitation, relying solely on *Pappu*’s grouping of packets into a flow using *only the five tuple* (i.e., only packet header data). Pet. at 42–43.² Thus, *Pappu* fails to disclose “grouping together those packets having similar values of said *traffic packet characteristics* into a presumed session,” as recited in independent Claim 15. See EX1001, 13:33–35 (emphasis added); EX2001, ¶¶ 80–84. This claim element is completely missing from *Pappu*.

Pappu fails to disclose or suggest three separate limitations that make use of the term “traffic packet characteristics,” as recited in independent Claim 15, the only challenged independent claim. All other challenged claims depend from independent Claim 15. For at least these reasons, the Petition should not be instituted.

2. *Pappu* Does Not Disclose Any of the “Session” Limitations.

a. *Pappu* Does Not Disclose “Sessions.”

² Petitioner alternatively argues that *Pappu* in view of *Peleg* discloses this limitation. Patent Owner discusses the flaws in this proposed combination in Section III.F *infra*.

Pappu does not disclose managing *sessions*. Instead, *Pappu* discloses managing *flows*. EX2001, ¶ 85. Flows are distinct from and are not sessions. *Id.* at ¶¶ 86–92. *Pappu*’s “flow” is a set of packets uniquely identified by their “five tuple” (i.e., layer-3 and layer-4 packet header information). *Id.* at ¶ 86. A session is a set of packets that relates to an application-level (i.e., layer-7), bidirectional communication. *Id.* at ¶ 87. A session’s packets may belong to multiple flows. *Id.* A flow may include packets from multiple sessions. *Id.* In *Pappu*, all packets in a flow are treated the same. *Id.* at ¶ 90. For example, once a router establishes a flow for a plurality of video streams, the router treats all packets within that flow the same. In contrast, session-based networking allows packets within a flow to be treated differently for the purposes of priority and bandwidth-shaping. *Id.* at ¶ 91.

Illustrative differences between a “session” and a “flow” are described as follows. 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. *Id.* at ¶ 92. While characteristics of the packets included in a flow or session may be the same (because the packets are the same), the goals, problems, and solutions of managing flows as opposed to managing sessions are different. *Id.* at ¶¶ 86–92. The ’629 Patent explicitly addresses the particulars of managing sessions. *See, e.g.,* EX1001, 1:46–2:3 (“It is desirable to identify packets as belonging to a **session** to

group the succession of IP packets and also to identify a particular application or type that the session belongs to) (emphasis added).

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 a potential session is a better use of available resources than treating all flows interchangeably.”³ Pet. at 45. Thus, even Petitioner recognizes that the challenges and solutions involved in managing sessions and managing flows are different.

Petitioner also recognizes the distinction between sessions and flows in their own product documentation. While its definition of a “session” is narrower than that of the ’629 Patent, Petitioner Palo Alto Networks 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.” EX2002 (emphasis added).

The challenged claims recite **sessions, not flows**. The preamble of independent Claim 15 recites a “method of identifying **session** type.” EX1001, 13:26 (emphasis added). The body of independent Claim 15 recites: “grouping

³ Petitioner states this one page after arguing *Pappu* alone discloses grouping packets into a presumed session. See Section III.F.3, *infra*. Petitioner cannot have it both ways. Either *Pappu* is insufficient and does not disclose managing sessions or Petitioner has failed to state *Pappu*’s deficiencies and its proposed combination is improper.

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*** characteristic[s];” and “using said session characteristics to identify a ***session*** type of said *presumed session*,” among other limitations. *Id.* at 13:33–40 (emphasis added).

Pappu fails to disclose any information related to dealing with ***sessions*** as opposed to ***flows***. *Pappu* explicitly uses “flow” throughout its disclosure. *E.g.*, EX1004, Title, Abstract, 2:34–3:30, 5:48–6:57. Further, *Pappu*’s solution using a “five tuple” (i.e., header-only information) does not address the problem solved by the ’629 Patent: that header-only information is insufficient and “simplistic” for **managing sessions**. EX1001, 2:8–9; EX2001, at ¶¶ 64–68. The reason for this is that *Pappu* does not manage sessions. *Id.* at ¶ 85. Thus, *Pappu*’s teaching regarding “flows” is **simply not relevant** to the claimed **session** limitations of the ’629 Patent.

As detailed below, Claim 15 recites three separate limitations that reference sessions: (1) grouping together those packets having similar values of said traffic packet characteristics into a ***presumed session***; (2) analyzing said grouped packets of said ***presumed session*** for ***session characteristic[s]***; and (3) using said ***session characteristics*** to identify a ***session type*** of said *presumed session*. Because *Pappu* does not disclose sessions, *Pappu* fails to disclose at least these limitations in Claim 15 and the Petition should therefore be denied.

b. *Pappu* in View of *Peleg* Does Not Disclose “Grouping Together Those Packets Having Similar Values of said Traffic Packet Characteristics into a Presumed Session.”

As detailed in Sections III.A and III.B.2.a *supra*, *Pappu* does not disclose “traffic packet characteristics,” which require more than packet header information, or a “session.” *Pappu* therefore does not disclose grouping packets into a “presumed session” based on “traffic packet characteristics.”

Nonetheless, Petitioner first argues that *Pappu* alone discloses this limitation, relying on *Pappu*’s use of *header-only data* (i.e., the “five tuple”) to group packets into “previously unknown *flows*.” Pet. at 42 (emphasis added) (citing EX1004, 6:17–26). Petitioner then attempts to argue that using the five tuple “into a flow is not necessarily sufficient to identify the specific session and therefore the grouping is only a presumed session.” Pet. at 43. But, the portion of *Pappu* to which Petitioner cites teaches only identifying *flows* not *sessions*: “Although a packet’s five tuple may determine the *flow* to which the packet belongs, the packet’s five tuple alone does not necessarily determine which actions router 102 will apply to that packet.” See EX1004, 8:16–25 (emphasis added).

Although Petitioner argues that *Pappu* alone discloses this limitation, Petitioner also acknowledges the failure of its own argument: “A POSA would have understood that taking into consideration that packets can belong to an identified or a potential session is a better use of available resources than treating all flows

interchangeably.” Pet. at 45. That is, Petitioner first asserts *Pappu*’s sufficiency: “Pappu discloses grouping packets with [] similar header information into previously unknown flows.” Pet. at 42. Then Petitioner contradicts this argument in recognizing that “treating all flows interchangeably,” which is endemic to managing flows, is a problem.

Petitioner relies on *Pappu*’s teaching of “previously unknown flows” as disclosing the claimed “presumed session.” Pet. at 42. That conclusion is faulty. The ’629 Patent explicitly describes a presumed *session*: “Thus packets believed to belong to the same *session* can be grouped together so that the session itself can be analyzed.” EX1001, 7:3–7 (emphasis added). Because Petitioners have not shown that *Pappu* teaches sessions, *Pappu* does not disclose or suggest the claimed “presumed session.”

For at least these reasons, *Pappu* fails to disclose “grouping together those packets having similar values of said traffic packet characteristics into a presumed session.” Petitioner asserts *Peleg* cures this deficiency. As detailed in Section III.F.1 *infra*, however, *Peleg* also does not disclose the claimed “presumed session” because *Peleg* also does not teach a session as described in the ’629 Patent. EX2001, ¶¶ 152–54. This element is **completely missing** from *Peleg*. *Id.* at ¶ 153.

Regardless of how the grouped packets are characterized, *Pappu* fails to analyze those grouped packets for *session* characteristics, as detailed in the next section.

c. *Pappu* Does Not Disclose “Using said Session Characteristics to Identify a Session Type of Said Presumed Session.”

Among other limitations, independent Claim 15 recites two separate steps: (1) grouping together those packets having similar values of said traffic packet characteristics into a presumed session; and (2) using said session characteristics to identify a session type of said presumed session. EX1001, 13:33–40. Besides not disclosing “session characteristics” or a “presumed session,” *Pappu* does not disclose the claimed *two-step process*.

Petitioner argues *Pappu* discloses this limitation because it uses behavioral statistics to identify traffic type of a flow. Pet. at 48–49. As detailed above, a flow type cannot be equated with the claimed “session type.” Further, *Pappu* employs only a *single-step* process in which the behavioral statistics are *already associated* with a known flow type. For example, *Pappu* states: “In one embodiment of the invention, the VOIP policy [] is applied to UDP flows[] to determine whether those UDP flows represent VOIP traffic” EX1004, 9:39–48.

There is no *identification* step in *Pappu*’s process. *Pappu* simply takes a pre-established, pre-identified behavioral model and applies it to current data. By

contrast, the '629 Patent describes a process whereby a specific service or application is identified *after* analyzing the session characteristics. Identifying the session type is a key difference between managing *flows* and managing *sessions*. EX2001, ¶ 132. It may be sufficient in a flow-based management process to identify a flow as “VOIP.” In a session-based environment, however, *session type* is associated with the type of service or application required for the session. The difference is one between identifying a flow as “VOIP” and identifying a session as “using code type X, or voice session using Skype,” as the '629 Patent teaches. *See* EX1001, 7:8–16; EX2001, ¶ 133. Thus, *Pappu* fails to disclose at least “analyzing said grouped packets of said presumed session for session characteristics,” as recited in independent Claim 15.

As detailed above, *Pappu* fails to disclose several limitations of independent Claim 15, the only challenged independent claim. All other challenged claims depend from independent Claim 15. For at least these reasons, the Board should decline to institute the Petition.

D. Dependent Claim 18 is Not Obvious Over *Pappu* in View of *Peleg*.

Challenged Claim 18 recites a method according to independent Claim 15, “further comprising thresholding said traffic characteristics, and identifying those packets whose characteristics are mutually within said threshold for said grouping.” EX1001, 13:17–50. Petitioner states *Pappu* alone discloses this limitation, arguing,

“Pappu set the threshold that packets are deemed to belong to the same flow if they have the five tuple in common” Pet. at 51–52. Because a binary choice of “everything either matches or it doesn’t” does not constitute a “threshold,” *Pappu* does not disclose Claim 18 and the Petition should be denied. EX2001, ¶¶ 135–38.

E. Dependent Claims 17 and 20–22 are Not Obvious Over *Pappu* in View of *Peleg*.

As detailed above, Petitioner’s cited art does not disclose each and every limitation of independent Claim 15, the only challenged independent claim. As Claims 17 and 20–22 depend from Claim 15, these claims are also patentable.

F. The Combination of *Pappu* and *Peleg* is Improper.

Among other limitations, independent Claim 15 recites “grouping together those packets having similar values of said traffic packet characteristics into a presumed session.” EX1001, 13:33–35. Petitioner argues that either *Pappu* discloses this limitation or, to “the extent that the Patent Owner asserts that *Pappu* does not disclose grouping packets in a presumed session, it would have been obvious in view of *Peleg*.” Pet. at 42–43. As detailed below, the combination of *Pappu* and *Peleg* is improper.

1. *Peleg* Teaches Away from a Combination with *Pappu*.

Pappu stands in direct contrast to *Peleg* because *Pappu* relies on header-only data. *Peleg* recognizes the limitations of that approach: “An additional significant limitation of prior-art devices operating on the bases of ports identification, is that

port identification is not a robust mechanism. Moreover, port identification algorithms are easy to go around, and it is not necessarily possible to know through which ports the transmissions are taking place.” EX1006 at [0005].

As detailed above, *Pappu* relies on packet analysis based solely on packet header information. See Section III.B.1, *supra*; EX2001, ¶¶ 63–69. *Peleg* disparages reliance on header-only information. EX1006 at [0005]. One of ordinary skill in the art would see *Peleg*’s description of the limitations of *Pappu* and would therefore see no motivation to combine the two references. EX2001, ¶ 148.

2. Under Petitioner’s Characterization, *Peleg* and *Pappu* Address Different Problems.

Petitioner states (with no support, even from its expert) that *Peleg* and *Pappu* “address the same problems (e.g., efficiently allocating resources network resources [sic] to packet flows).” Pet. at 45. Petitioner had however earlier described *Peleg* as “grouping packets in potential *sessions*, and then deciding if there is an identified *session*.” *Id.* at 44 (emphasis added). **Either *Peleg* teaches flows or it teaches sessions; Petitioner cannot have it both ways.** Flow management and session management are different problems requiring different solutions. *Pappu* and *Peleg* do address the same problem: *flow* classification. EX2001, ¶ 151. Neither addresses sessions. Petitioner has therefore failed to meet its burden to specify how its cited art renders the challenged claims obvious under 35 U.S.C. § 103. See 37 C.F.R. § 42.104(b).

**3. Petitioner Fails to Provide a Proper Motivation to Combine
Pappu and *Peleg*.**

Petitioner states that *Pappu* discloses “grouping packets with the similar header information (similar values of said traffic packet characteristics) into previously unknown flows (presumed session). Pet. at 42 (emphasis in original removed). Yet, Petitioner attempts to hedge this position by arguing that, should Patent Owner argue against this, “it would have been obvious in view of *Peleg*.” *Id.* at 43. Petitioner can’t have it both ways. Petitioner cannot argue that it would have been obvious for one of ordinary skill in the art to attempt to remedy deficiencies in *Peleg* when the Petitioner has failed to identify any specific deficiencies in *Peleg*.

That is, the Petitioner has failed to identify *any differences* between Claim 15 and *Pappu*. Articulating the differences between the claimed invention and the prior art is essential to an obviousness inquiry. *See Graham v John Deere & Co.*, 383 U.S. 1 (1966). “Failure on the part of a petitioner to explicitly identify a difference complicates an evaluation of obviousness.” *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2015-01402, Paper No. 18 at p. 13 (Oct. 21, 2015). The “absence of an articulated difference renders it difficult to present, and have a patent owner and the Board analyze, whether a petitioner has set out ‘some articulated reasoning with rational underpinning to support the legal conclusion of obviousness.’” *Id.* Where, as here, Petitioner fails to articulate the pertinent “differences,” the Board should reject such obviousness arguments. *Id.*; *see also*

Front Row Techs., Inc. v. MLB Advanced Media, L.P., IPR2015-01932, Paper No. 7 at pp. 17, 19–20, 22 (March 25, 2016).

For at least these reasons, Petitioner’s proposed combination of *Peleg* and *Pappu* is improper. Petitioner has therefore failed to meet its burden under 37 C.F.R. § 42.104 to identify how the challenged claims are unpatentable under 35 U.S.C § 103 and the Petition should be denied. Further, as detailed in the next section, even if the combination were proper, the combination fails to disclose each and every limitation of the challenged claims.

G. The Combination of *Pappu* and *Peleg* Does Not Disclose or Suggest the “Session” and “Packet Traffic Characteristics” Limitations of Independent Claim 15.

Among other limitations, independent Claim 15 recites “grouping together those packets having similar values of said traffic packet characteristics into a presumed session.” EX1001, 13:33–35. Petitioner argues that either *Pappu* discloses this limitation or, to “the extent that the Patent Owner asserts that *Pappu* does not disclose grouping packets in a presumed session, it would have been obvious in view of *Peleg*.” Pet. at 42–43. Section III.B, *supra*, details the many failings of *Pappu*. *Peleg* does not remedy these deficiencies.

1. *Peleg* Does Not Disclose or Suggest a “Presumed Session.”

As a threshold matter, although *Peleg* uses the term “session,” the disclosure of *Peleg* describes flows. EX2001, ¶ 152. For example, *Peleg* explicitly states: “As

known in the art, sessions, by definition, are unidirectional, and therefore each packet should belong to one unidirectional session.” EX1006, [0065]. (As detailed in Section III.B.2.a, *supra*, a “session” is not unidirectional.)

Further, there is no disclosure in *Peleg* that would lead one of ordinary skill in the art to group packets into a “presumed session.” EX2001, ¶ 153. Independent Claim 15 requires that grouped packets are of “**unknown session** types.” EX1001, 13:27–28 (emphasis added). *Peleg* explicitly states that its “session types” are **already known**: “In an embodiment of the present invention, the sessions are VoIP session, and/or Multimedia over IP sessions.” EX1006, [0020]. Although *Peleg* also states that “there is no intent of limiting the scope of the present invention to” these types of sessions, *id.*, there is no indication in *Peleg* that the session type is **not already known** at the beginning of the process. Thus, *Peleg* does not disclose Claim 15’s “presumed session.”

2. The Proposed Combination of *Pappu* and *Peleg* Does Not Disclose the “Session” or “Traffic Packet Characteristics” Limitations of Claim 15.

Petitioner argues one of ordinary skill in the art would be motivated to combine *Pappu* and *Peleg* to “thereby allow treating the identified sessions differently from potential sessions in order to allocate resources more efficiently.” Pet. at 44. Petitioner thus concedes that *Pappu* does not disclose session management. Assuming that *Pappu* and *Peleg* were combined, the resultant

combination would not disclose the “session” or “traffic packet characteristics” limitations of Claim 15.

First, *Peleg* does not disclose a “session.” EX2001, ¶¶ 56–58. Although *Peleg* uses the word “session,” *e.g.*, EX1006 at [0020], there is insufficient disclosure in *Peleg* to explain how *Peleg* would actually manage a session. *Peleg* teaches a packet and inter-arrival “range” that *Peleg* uses only if it’s within the same *flow*. EX1006 at [0032] (“If the length of the packet meets the length-range requirements, the appropriate IP source and IP destination, plus optional additional information (such as source and destination port number), are looked for in a sessions table. It is to be noted that the length can be a range, i.e. as long as the packet is in the length, it can be classified.”); *see also* EX1006 at [0038]; EX2001, ¶ 157. This is the extent of *Peleg*’s discussion of the inter-arrival “range,” and *Peleg* does not include any discussion of how such an arrangement would be applicable to multiple flows in a session. EX2001, ¶ 157. *Peleg*’s vague language with respect to the inter-arrival “range” would not allow one of ordinary skill in the art to determine how *Peleg* would implement this “range” for **session** management. *Id.* at ¶ 158. As detailed in Sections III.B.2 and III.F.1, flow management is insufficient to disclose session management. *See id.* at ¶¶ 85–96, 152–54.

Further, combining the teachings of *Pappu* and *Peleg* with respect to grouping packets does not disclose the “session” limitations of Claim 15. According to

Petitioner's assertion, *Peleg*'s "presumed session" would be used by *Pappu* to make "better use of available resources than treating all flows interchangeably." Pet. at 45. *Peleg*'s use of the term "session" aside, nothing in *Peleg* indicates that incorporating *Peleg* into *Pappu* would result in anything other than treating all flows interchangeably. Grouping packets based on the combination of *Peleg* and *Pappu* would result in flows with similar packet-length and inter-arrival times, which will not handle a multi-session-based flow, nor a multi-flow-based session. *Id.* at ¶ 160. The proposed combination would only function for simple unidirectional flows (e.g., VoIP). *Id.* As detailed above in Section III.B.2, a session is a bidirectional communication.

Additionally, the combination of *Peleg* and *Pappu* does not disclose the "traffic packet characteristics" limitations of Claim 15, which require more than packet header information. Petitioner's proposed combination would require *Peleg* to accept as inputs "those packets having similar values of said traffic packet characteristics." As detailed in Section III.B.1, *supra*, *Pappu* makes use of only header-only information (i.e., the five tuple). If header-only information is the input to *Peleg*—and Petitioner has suggested nothing to the contrary—then *Peleg* would simply group packets based on that header-only information. Even assuming that *Peleg* sufficiently described how to group such packets into a "presumed session," these "sessions" would be based on header-only information.

Claim 15’s “presumed session” is a result of “grouping together those packets having similar values of said traffic packet characteristics,” which require *more than header-only information*. Therefore, the combination of *Pappu* and *Peleg* would not result in a “presumed session” based on *more than header-only information*. Thus, the proposed combination of *Pappu* and *Peleg* would not result in a method including “grouping together those *packets having similar values of said traffic packet characteristics* into a presumed session,” as recited in Claim 15.

For at least these reasons, even if Petitioner’s proposed combination of *Pappu* and *Peleg* were proper, the combination still does not disclose each and every limitation of independent Claim 15. Specifically, the combination of *Pappu* and *Peleg* fails to disclose Claim 15’s “**session**” limitations and fails to disclose the “traffic packet characteristics limitations,” which require **more than packet header information**. Thus, the Board should reject Petitioner’s challenge to Claims 15 and 17-22 and confirm the validity of all challenged claims.

V. CONCLUSION

For the reasons set forth above, Patent Owner respectfully requests that all challenges be dismissed, and all challenged claims confirmed as valid.⁴

⁴ Patent Owner does not concede the legitimacy of any arguments in the Petition that are not specifically addressed herein.

Date: November 20, 2018

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Response to Petition complies with the type-volume limitation of 37 C.F.R. § 42.24(b)(2) because it contains fewer than the limit of 14,000 words, as determined by the word-processing program used to prepare the brief, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a)(1).

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CERTIFICATE OF FILING AND SERVICE

I certify that I served an electronic copy of the foregoing PATENT OWNER'S RESPONSE PURSUANT TO 37 C.F.R. § 42.120(a) along with EXHIBIT 2005 are being filed via PTAB E2E and served by electronic mail this 20th day of November on counsel for Petitioner as follows:

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