

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC. and PALO ALTO NETWORKS, INC.,
Petitioner,

v.

PACKET INTELLIGENCE LLC,
Patent Owner.

IPR2020-00337
Patent 6,771,646 B1

Before STACEY G. WHITE, CHARLES J. BOUDREAU, and
JOHN D. HAMANN, *Administrative Patent Judges*.

BOUDREAU, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–3, 7, 16, and 18 (“the challenged claims”) of U.S. Patent No. 6,771,646 B1 (Ex. 1003, “the ’646 patent”). We have jurisdiction under 35 U.S.C. § 6 and enter this Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1, 2, 7, 16, and 18 are unpatentable, but that Petitioner has not shown that claim 3 is unpatentable. *See* 35 U.S.C. § 316(e).

II. BACKGROUND

A. Procedural History

Juniper Networks, Inc. and Palo Alto Networks, Inc. (collectively “Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting *inter partes* review of claims 1–3, 7, 16, and 18 of the ’646 patent pursuant to 35 U.S.C. § 311. Petitioner supported its Petition with the Declaration of Dr. Jon B. Weissman. Ex. 1006. Packet Intelligence LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).¹

On September 10, 2020, pursuant to 35 U.S.C. § 314(a), we instituted trial to determine whether any challenged claim of the ’646 patent is unpatentable based on the grounds raised in the Petition:

¹ On our authorization (Paper 8), Petitioner also filed a Preliminary Reply (Paper 9), and Patent Owner filed a Preliminary Sur-reply (Paper 10) related to discretionary denial of institution under 35 U.S.C. § 314(a).

Claims Challenged	35 U.S.C. §²	References
1–3, 7, 16, 18	103(a)	Riddle, ³ Ferdinand, ⁴ Wakeman ⁵
1–3, 7, 16, 18	103(a)	Riddle, Ferdinand, Wakeman, Yu ⁶
1–3, 7, 16, 18	103(a)	Riddle, Ferdinand, Wakeman, RFC1945 ⁷

Paper 20, 8, 56 (“Institution Decision” or “Inst. Dec.”).⁸

Patent Owner filed a Response. Paper 26 (“PO Resp.”). Patent Owner supported its Response with the Declaration of Cathleen T. Quigley. Ex. 2061. Petitioner filed a Reply to Patent Owner’s Response. Paper 30 (“Reply”). Patent Owner filed a Sur-reply. Paper 32 (“Sur-reply”).

A combined oral hearing in this proceeding and IPR2020-00336, involving a related patent, was held on June 9, 2021. A transcript of the hearing is included in the record. Paper 47 (“Tr.”). The transcript of an oral hearing held the same day in cases IPR2020-00338, IPR2020-00339, and

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’646 patent issued from an application filed before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.

³ Riddle et al., US 6,412,000 B1 (issued June 25, 2002) (Ex. 1008).

⁴ Ferdinand et al., WO 92/19054 (published Oct. 29, 1992) (Ex. 1009).

⁵ Wakeman et al., US 5,740,175 (issued Apr. 14, 1998) (Ex. 1014).

⁶ Yu, US 6,625,150 B1 (issued Sept. 23, 2003) (Ex. 1011).

⁷ T. Berners-Lee et al., *Hypertext Transfer Protocol -- HTTP/1.0*, Request for Comments: 1945, Network Working Group (May 1996) (Ex. 1010).

⁸ Patent Owner filed a Request for Rehearing of the Institution Decision (Paper 24), which we denied (Paper 27).

IPR2020-00486, also involving patents related to the '646 patent, also is included in the record of this proceeding.⁹ Paper 46.

Following oral hearing, we ordered the parties to provide additional briefing on the claim-construction arguments presented in the briefs and at oral hearing. Paper 41 (“Order”). Petitioner and Patent Owner each filed respective Opening Briefs on claim construction. *See* Paper 42 (“Petitioner’s Opening Brief” or “Pet. Br.”); Paper 43 (“Patent Owner’s Opening Brief” or “PO Br.”). Petitioner filed a Responsive Brief to Patent Owner’s Opening Brief, Paper 44 (“Petitioner’s Responsive Brief” or “Pet. Resp. Br.”), and Patent Owner filed a Responsive Brief to Petitioner’s Opening Brief, Paper 45 (“Patent Owner’s Responsive Brief” or “PO Resp. Br.”).

B. Real Parties in Interest

Petitioner identifies Juniper Networks, Inc. and Palo Alto Networks, Inc. as its real parties in interest. Pet. 1. Patent Owner identifies Packet Intelligence LLC and Packet Intelligence Holdings LLC as its real parties in interest. Paper 6, 2.

C. Related Matters

The parties identify two district court litigations as related matters that involve the '646 patent: *Packet Intelligence LLC v. Juniper Networks, Inc.*, 3:19-cv-04741 (N.D. Cal.) and *Palo Alto Networks, Inc. v. Packet Intelligence LLC*, No. 3:19-cv-02471 (N.D. Cal). Pet. 1; Paper 6, 2. The parties also identify *Packet Intelligence LLC v. NetScout Systems, Inc.*, 2:16-

⁹ The parties had no objection to entering into this record the transcript from the oral hearing for IPR2020-00338, IPR2020-00339, and IPR2020-00486. Tr. 7:15–8:5; *see also* Paper 46, 5:22–6:10.

cv-230-JRG (E.D. Tex.) and *Packet Intelligence LLC v. NetScout Sys., Inc.*, No. 19-2041 (Fed. Cir.) as related matters. Pet. 1; Paper 6, 2.

The parties also identify as related matters IPR2017-00450 and IPR2019-01292, no longer pending before the Board, which challenged certain claims of the '646 patent, as well as certain other earlier proceedings that challenged claims of various related patents. Pet. 2; Paper 6, 3–5.

D. The '646 Patent (Ex. 1003)

The '646 patent, titled “Associative Cache Structure for Lookups and Updates of Flow Records in a Network Monitor,” discloses a network activity monitor with a cache subsystem. Ex. 1003, code (54), 1:42–3:14. The '646 patent explains that there was a need in the art for “a real-time network monitor that can provide details as to the application programs being used.” *Id.* at 1:42–47. The disclosed monitor receives packets passing in either direction through its connection point on the network and “elucidate[s] what application programs are associated with each packet” by extracting information from the packet, using selected parts of the extracted information to “build[] a signature for identifying the conversational flow of the packet,” and performing a lookup of “a database of flow records for previously encountered conversational flows to determine whether [the] signature is from an existing flow.” *Id.* at 1:66–2:28, 4:61–5:8, Fig. 1. The '646 patent states that due to the high speed at which packets enter the system, it is advantageous to use a cache system for the memory containing the flow database. *Id.* at 2:37–62. “One desirable property of such a cache system is a least recently used (LRU) replacement policy that replaces the LRU flow-entry when a cache replacement is needed.” *Id.* at 2:53–56. “Replacing least recently used flow-entries is preferred because it is likely

that a packet following a recent packet will belong to the same flow.” *Id.* at 2:56–58.

Figure 3 of the '646 patent is reproduced below.

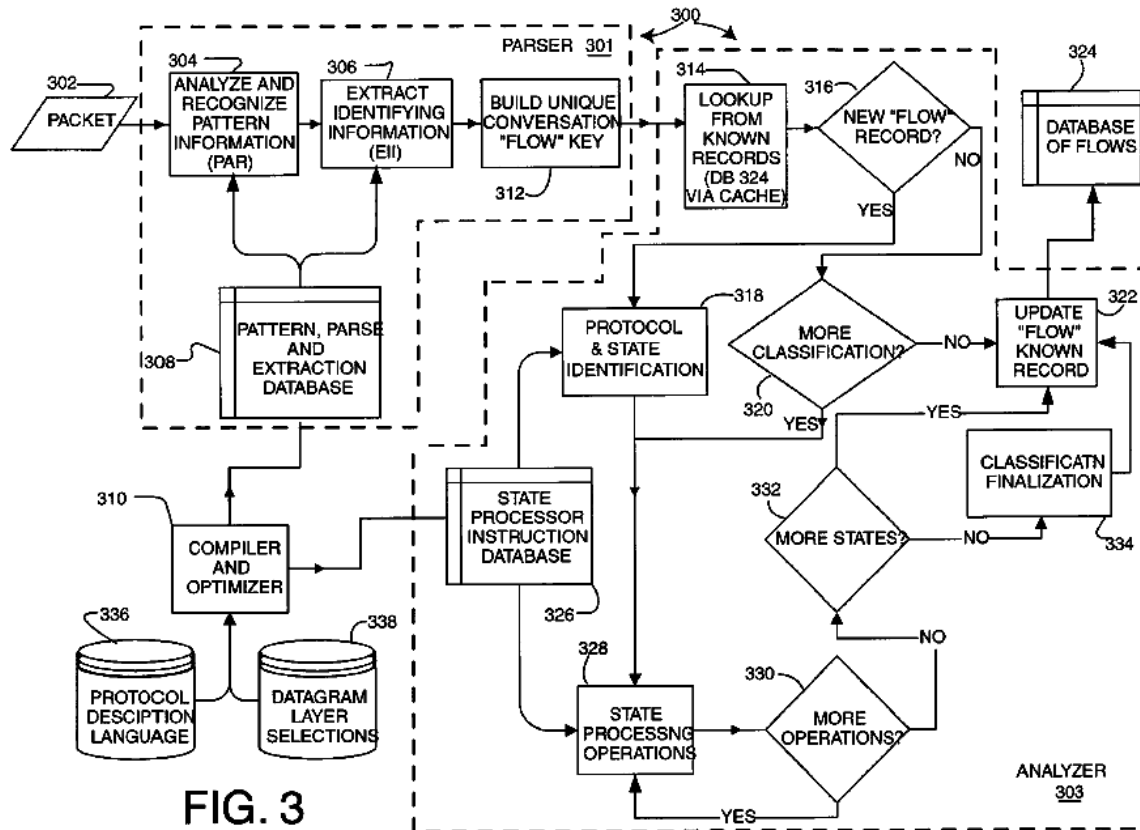


Figure 3, above, depicts various components of network packet monitor 300, including parser subsystem 301, analyzer subsystem 303, and database of known flows 324. Ex. 1003, 7:36–58. Parser subsystem 301 “pares the packet and determines the protocol types and associated headers for each protocol layer that exists in the packet 302,” “extracts characteristic portions (signature information) from the packet 302,” and builds the “unique flow signature (also called a ‘key’) for this flow.” *Id.* at 8:5–9:28, 27:66–29:61 (describing an example of how the disclosed monitor builds signatures and flow states in the context of a Sun Remote Procedure Call (RPC), where,

after all of the required processing, “KEY-2 may . . . be used to recognize packets that are in any way associated with the application ‘a²’”), Fig. 2.

Analyzer system 303 then determines whether the packet has a matching flow-entry in database of flows 324, and processes the packet accordingly, including, for example, determining whether the packet belongs to an existing conversational flow or a new (i.e., not previously encountered) flow and, in the case of the latter, performing state processing to determine whether the conversational flow has been “fully characterized” and should be finalized. Ex. 1003, 9:45–12:34, 19:46–20:2, 30:13–36:28, Fig. 11. The ’646 patent discloses that

[f]uture packets that are part of the same conversational flow have their state analysis continued from a previously achieved state. When enough packets related to an application of interest have been processed, a final recognition state is ultimately reached, i.e., a set of states has been traversed by state analysis to completely characterize the conversational flow. The signature for that final state enables each new incoming packet of the same conversational flow to be individually recognized in real time.

In this manner, one of the great advantages of the present invention is realized. Once a particular set of state transitions has been traversed for the first time and ends in a final state, a short-cut recognition pattern—a signature—an [sic] be generated that will key on every new incoming packet that relates to the conversational flow. Checking a signature involves a simple operation, allowing high packet rates to be successfully monitored on the network.

Id. at 11:67–12:17.

E. The Challenged Claims

Petitioner challenges claims 1–3, 7, 16, and 18 of the '646 patent, of which claims 1, 7, and 16 are independent. Pet. 7. Claims 1 and 16, reproduced below, illustrate the claimed subject matter.

1. A packet monitor for examining packets passing through a connection point on a computer network, each packet conforming to one or more protocols, the monitor comprising:

(a) a packet acquisition device coupled to the connection point and configured to receive packets passing through the connection point;

(b) a memory for storing a database comprising flow-entries for previously encountered conversational flows to which a received packet may belong, a conversational flow being an exchange of one or more packets in any direction as a result of an activity corresponding to the flow;

(c) a cache subsystem coupled to the flow-entry database memory providing for fast access of flow-entries from the flow-entry database;

(d) a lookup engine coupled to the packet acquisition device and to the cache subsystem and configured to lookup whether a received packet belongs to a flow-entry in the flow-entry database, the looking up being via cache subsystem; and

(e) a state processor coupled to the lookup engine and to the flow-entry-database memory, the state processor being to perform any state operations specified for the state of the flow starting from the last encountered state of the flow in the case that the packet is from an existing flow, and to perform any state operations required for the initial state of the new flow in the case that the packet is not from an existing flow.

16. A method of examining packets passing through a connection point on a computer network, each packets conforming to one or more protocols, the method comprising:

- (a) receiving a packet from a packet acquisition device;
- (b) performing one or more parsing/extraction operations on the packet to create a parser record comprising a function of selected portions of the packet;
- (c) looking up a flow-entry database comprising none or more flow-entries for previously encountered conversational flows, the looking up using at least some of the selected packet portions and determining if the packet is of an existing flow, the lookup being via a cache;
- (d) if the packet is of an existing flow, classifying the packet as belonging to the found existing flow; and
- (e) if the packet is of a new flow, storing a new flow-entry for the new flow in the flow-entry database, including identifying information for future packets to be identified with the new flow-entry,

wherein the parsing/extraction operations depend on one or more of the protocols to which the packet conforms.

Ex. 1003, 36:39–67, 39:10–40:4, 44–47 (Certificates of Correction).

III. ANALYSIS

We have reviewed the parties’ respective briefs as well as the relevant evidence discussed in those papers. For the reasons discussed in detail below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–2, 7, 16, and 18 of the ’646 patent are unpatentable under 35 U.S.C. § 103 as having been obvious, but has not shown by a preponderance of the evidence that claim 3 is unpatentable.

A. Legal Standards

To prevail in its challenges to the patentability of the challenged claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2019). “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) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375–78 (Fed. Cir. 2016) (discussing the burden of proof in *inter partes* review).

A claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, “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.” 35 U.S.C. § 103(a) (2006); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). A petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *Magnum Oil*, 829 F.3d at 1380. Moreover, a decision on the ground of obviousness must include “articulated reasoning with some rational underpinning to support the legal conclusion of

¹⁰ The parties do not direct our attention to any evidence of objective indicia of nonobviousness.

obviousness.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

We analyze Petitioner’s asserted grounds of unpatentability in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

We consider the asserted grounds of unpatentability in view of the understanding of a person of ordinary skill in the art and, thus, begin with the level of ordinary skill in the art. The level of ordinary skill in the art is “a prism or lens through which . . . the Board views the prior art and the claimed invention” to prevent hindsight bias. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). “[O]ne or more factors may predominate.” *Id.*

Petitioner contends that an ordinarily skilled artisan would have “had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field (or its equivalent), and one to two years of experience working in networking environments, including at least some experience with network traffic monitors and/or analyzers.” Pet. 7–8 (citing, *inter alia*, Ex. 1006 ¶¶ 195–201). In our Institution Decision, we adopted Petitioner’s articulation of the level of skill in the art, which we determined was consistent with the ’646 patent and the asserted prior art. Inst. Dec. 25–26. In its Response, Patent Owner states that it “generally does not object to this finding.” PO Resp. 22.

We apply Petitioner’s definition of the level of ordinary skill in the art, as we did in the Institution Decision. Inst. Dec. 25–26. We also maintain our determination that the definition offered by Petitioner is consistent with the teachings of the ’646 patent and the prior art of record. *Cf. Okajima*, 261 F.3d at 1355 (noting that the prior art itself may reflect an appropriate level of skill in the art).

C. Claim Construction

In interpreting the claims of the ’646 patent, we “us[e] the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. [§] 282(b).” 37 C.F.R. § 42.100(b). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as would have been understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). We need not explicitly interpret every claim term for which the parties propose a construction. *See* 35 U.S.C. § 314(a) (2012); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

1. Incorporation by reference of previous disclosures

The ’646 patent claims the benefit of U.S. Provisional Application No. 60/141,903, filed on June 30, 1999 (Ex. 1016, “the provisional application”). *See* Ex. 1003, code (60). The ’646 patent states that the contents of the provisional application, as well as the contents of several

other U.S. patents and applications, including U.S. Patent No. 6,651,099, issued on November 18, 2003 (Ex. 1001, “the ’099 patent”), “are incorporated herein by reference.” *See id.* at 1:7–11 (incorporating by reference the provisional application), 1:16–18 (incorporating by reference the ’099 patent), 1:19–23 (incorporating by reference U.S. Patent No. 6,665,725), 1:25–29 (incorporating by reference U.S. Patent Application No. 09/608,126), 1:30–33 (incorporating by reference U.S. Patent Application No. 09/608,267). Throughout their papers, the parties refer to the disclosures of the ’099 patent and the provisional application, and state that the ’646 patent incorporates the entire contents of those disclosures. *See, e.g.*, PO Resp. 2 n.1; Reply 2 n.1, 3–4.

We agree with the parties that the ’646 patent incorporates the disclosures of the ’099 patent and the provisional application by specific reference to those documents. Ex. 1003, code (60), 1:7–11, 1:16–18; *see also* 37 C.F.R. § 1.57. Thus, we also refer to the ’099 patent and the provisional application when discussing claim construction—not only for consistency with the parties, but also for consistency throughout our final decisions involving related *inter partes* proceedings between these parties. *See Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) (stating that material incorporated by reference is “effectively part of the host document as if it were explicitly contained therein”); *see also Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1365–66 (Fed. Cir. 2016) (using statements in a provisional application to construe claim terms in a patent incorporating the provisional application by reference).

2. Overview

The only claim-construction dispute remaining in this proceeding concerns the meaning of “conversational flow[s],” as recited in independent claims 1, 7, and 16. *See, e.g.*, Ex. 1003, 36:46–47 (claim 1 reciting “a memory for storing a database comprising flow-entries for previously encountered conversational flows”). At the heart of the parties’ dispute is the following passage from the ’099 patent:

A conversational flow, on the other hand, is the sequence of packets that are exchanged in any direction as a result of an activity—for instance, the running of an application on a server as requested by a client. It is desirable to be able to identify and classify conversational flows rather than only connection flows. The reason for this is that *some conversational flows involve more than one connection, and some even involve more than one exchange of packets between a client and server.*

Ex. 1001, 2:37–45 (emphases added). In our Institution Decision, we preliminarily construed “conversational flow” as a “sequence of packets that are exchanged in any direction as a result of an activity.” Inst. Dec. 29. We declined to include the phrases “for instance, the running of an application on a server as requested by a client” and “some conversational flows involve more than one connection,^[11] and some even involve more than one exchange of packets between a client and server” in the construction of “conversational flow,” as Patent Owner had requested. *Id.* We explained that those passages, because they begin with the phrases “for instance,” “where some,” and “some,” are “merely exemplary and non-limiting.” *Id.*

¹¹ The ’099 patent expressly defines “connection flow”: “The term ‘connection flow’ is commonly used to describe all the packets involved with a single connection.” Ex. 1001, 2:35–37. Neither party disputes this definition of “connection flow.”

Petitioner does not challenge our preliminary construction. Tr. 9:20–10:15. Patent Owner, however, argues that our construction captures only a “*part* of the definition in the specification,” and improperly “excludes some of the clarifying language that is *also* part of the explicit definition in the specification.” PO Resp. 23. According to Patent Owner, “[t]hat clarifying language is important for understanding the nature of a conversational flow.” *Id.*

Specifically, Patent Owner argues that the written description of the ’646 patent provides an express definition of the term “conversational flow” and that the express definition controls even though it contains exemplary language. *Id.* at 23–24 (citing *Sinorgchem Co., Shandong v. Int’l Trade Comm’n*, 511 F.3d 1132, 1137 (Fed. Cir. 2007)). Patent Owner argues that the language following “for instance” is necessary for understanding a “conversational flow,” because that language “makes apparent that ‘conversational flow’ must relate to a conversation” and “involves an application activity involving *the same client*.” *Id.* at 26 (emphasis added); *see also* Sur-Reply 1 (arguing that an “‘activity’ occurs between specific entities”); PO Br. 1 (arguing that an activity “must relate to the actions of a particular client or end user”). “Ignoring that language,” Patent Owner argues, “risks losing the basic and fundamental requirement of a ‘conversation.’” PO Resp. 26

Patent Owner also argues our construction is incorrect because, prior to this *inter partes* review, “every tribunal to have considered the proper construction for ‘conversational flow’ has accepted . . . the same construction advanced by Patent Owner” here:

the sequence of packets that are exchanged in any direction as a result of an activity—for instance, the running of an application

on a server as requested by a client—and where some conversational flows involved more than one connection, and some even involve more than one exchange of packets between a client and server.

PO Resp. 24–25. As an example, Patent Owner argues that the District Court for the Eastern District of Texas adopted this construction in *Packet Intelligence LLC v. NetScout Systems, Inc.*, and that the Court of Appeals for the Federal Circuit “addressed conversational flows and connection flows when **affirming** the jury’s infringement verdict in *NetScout*, which necessarily hinged on applying the court’s claim construction of ‘conversational flow.’” *Id.* at 25 (citing Ex. 2060, 3).

3. Analysis

Independent claims 1 and 7 recite a database that includes “flow-entries” for “previously encountered conversational flows.” Ex. 1003, 36:46–47 (claim 1), 38:7–9 (claim 7). Independent claim 16 recites a “database comprising none or more flow-entries for previously encountered conversational flows.” *See id.* at 39:18–20. As explained above, the parties agree that “conversational flow” includes “the sequence of packets that are exchanged in any direction as a result of an activity,” but disagree about whether the phrases “for instance, the running of an application on a server as requested by a client” and “some conversational flows involve more than one connection, and some even involve more than one exchange of packets between a client and server” should limit the meaning of “conversational flow.” Patent Owner argues that those phrases are necessary because they make clear that a conversational flow is client-specific. Thus, the parties’ basic dispute is whether a conversational flow is limited to a *specific client or user*, as Patent Owner argues, or may include *multiple clients or users*, as Petitioner contends. *Compare, e.g.*, PO Resp. 26 (arguing that “the basic

and fundamental requirement” of a “conversational flow” is that it “involves an application activity involving the same client”), *with* Reply 3 (contending that “[t]he definitional language of ‘conversational flow’ doesn’t contain any requirement for identifying flows based on a particular user or client”).

Starting with the passage reproduced above that we identified as the heart of the parties’ dispute (Ex. 1001, 2:37–45), we determine that the “for instance” phrase is exemplary and does not limit a “conversational flow” to a specific client or user. The phrase “for instance” is synonymous with “for example,” and necessarily indicates that “the running of an application on a server as requested by a client” exemplifies, but does not limit, the conversational flow to a server and a specific client or user.

Our determination that the “for instance” phrase is exemplary and non-limiting is consistent with Patent Owner’s argument in its Preliminary Response that the “some” phrase (“some conversational flows involve more than one connection, and some even involve more than one exchange of packets between a client and server”) is non-limiting. Specifically, Patent Owner argued that the use of the word “some” necessarily means that “*some* conversational flows involve multiple connections, while, *some* involve a single connection.” Prelim. Resp. 24. Similarly here, while “conversational flow” certainly may involve the running of an application on a server as requested by a single client or user, “conversational flow” is not *limited* to a single client or user.

Indeed, the ’099 patent and the provisional application expressly contemplate classifying connection flows from different clients into the same conversational flow when those connections involve the same activity. These documents describe, in the context of identifying packets as part of a conversational flow, a client/server protocol known as Service Advertising

Protocol (SAP), which is “used to identify the services and addresses of servers attached to a network.” Ex. 1016, 3:12–14; Ex. 1001, 2:49–52. The provisional application describes a packet exchange between a client and the server in which the client sends a SAP request to a server for print service, and the server sends a SAP reply that identifies the print service address:

In a first exchange, a client sends a SAP request to a server, for example, for print service. The server sends a SAP reply that identifies a particular address, for example, SAP #5, as the print service on that server. Such may be responses used to update a table, for example in a router, known as the Server Information Table.

Ex. 1016, 3:14–18; *see also* Ex. 1001, 2:53–58. The provisional application then describes a client who has “inadvertently seen” the SAP reply, and therefore does not need to make a SAP request, but may send a print request directly to SAP #5:

A client who has inadvertently seen this reply or who has access to the table (via the router that has the Server Information Table, for example) would know that SAP #5 for such this [*sic*] server is a print service. Therefore, in order to print data on the server, such a client does not need to make the request for a print service, but simply to send data to be printed specifying SAP #5.

Ex. 1016, 3:18–23; *see also* Ex. 1001, 2:58–64.

The provisional application explains that the packet exchange between the client who has “inadvertently seen” the print service address and SAP #5 is not connected to the initial packet exchange, “which was with a different client”:

This sending of data to be printed again involves an exchange of data between a client and a server, disjoint [*sic*] from the previous exchange which was *with a different client* setting up that SAP #5 is a print service on this server is a second connection.

Ex. 1016, 3:23–25 (emphasis added). Similarly, the '099 patent describes this packet exchange as “independent of the initial exchange.” Ex. 1001, 2:64–67.

The provisional application states that “[i]t is desirable for a network packet monitor to be able to ‘virtually concatenate’ the first exchange that defines SAP #5 as the print service on the server with the second exchange that uses the print service.” Ex. 1016, 3:25–28. In this case, the provisional application explains, the two packet exchanges (the first between a client and the server and the second between a client and SAP #5) “would then be correctly identified as being part of the same flow if the clients were the same,” but also, “[t]hey would *even be recognized if the clients were not the same.*” *Id.* at 3:28–30 (emphasis added). Similarly, the '099 patent states that “because one features [*sic*] of the invention is to correctly identify the second exchange as being associated with a print service on that server, such exchange would *even be recognized if the clients were not the same.*” Ex. 1001, 3:44–48 (emphasis added).

We interpret the SAP description in the provisional application and '099 patent as describing two seemingly disjointed packet exchanges involving two different clients or users (the first packet exchange between a client and the server and the second packet exchange between the client who has “inadvertently seen” the print service address and SAP #5) as belonging to the same “conversational flow.” And because Patent Owner’s proposed construction—that a “conversational flow” is client-specific—is inconsistent with the written description, we decline to limit a “conversational flow” to a specific client or user.

Patent Owner argues that our interpretation of the SAP example is incorrect because “[t]he second sentence” of that example—i.e., “such

exchange would even be recognized if the clients were not the same”—merely “illustrates how a later print request by a different client can also be recognized as a *print request activity* because it uses the now known address of the print service.” Sur-reply 7 (emphasis added). We are not persuaded. In the provisional application, this description of the second client follows the statement that “[i]t is desirable to be able to identify and classify *conversational flows*,” Ex. 1016, 3:7–8 (emphasis added), and is followed by statements describing “[o]ther protocols that are similar in that they may lead to disjointed *conversational flows*,” *id.* at 4:1–5 (emphasis added). The provisional application also states that “[p]rior art network monitors do not presently have the ability to recognize such disjointed flows as belonging to the same conversational flow.” *Id.* at 4:13–14. Similarly, in the ’099 patent, the phrase “such exchange would even be recognized if the clients were not the same” is soon followed by the statement that “[w]hat distinguishes this invention from prior art network monitors is that it has the ability to *recognize disjointed flows as belonging to the same conversational flow*.” Ex. 1001, 3:48–51 (emphasis added). We view these statements, in context, as reinforcing the notion that the disclosed invention sought to classify disjointed connection flows—even those involving more than one client or user—into the same conversational flow based on a specific activity, such as print service.

We are not persuaded by Patent Owner’s argument that *Sinorgchem* compels a different result here. *See* PO Resp. 24. In *Sinorgchem*, the claim language at issue was “controlled amount,” of which the patent stated:

A ‘controlled amount’ of protic material is an amount up to that which inhibits the reaction of aniline with nitrobenzene, e.g., up to about 4% H₂O based on the volume of the reaction mixture when aniline is utilized as the solvent.

511 F.3d at 1136. The International Trade Commission “agreed that the patentee had expressly defined the term ‘controlled amount’ in the specification but held that the language ‘e.g., up to about 4% H₂O based on the volume of the reaction mixture when aniline is utilized as the solvent’ should not be considered part of that definition,” in part because the Commission considered “the 4% limit as merely an example that did not apply to all situations in which aniline was used as the solvent.” *Id.* at 1137. The Federal Circuit rejected the Commission’s construction, holding that “[w]hen aniline is used as the solvent, the express definition is neither ambiguous nor incomplete—the ‘controlled amount’ is ‘up to about 4% H₂O based on the volume of the reaction mixture’—and we need look no further for its meaning.” *Id.* at 1138.

Patent Owner argues that *Sinorgchem* stands for the proposition that an express definition in the specification controls even if it contains exemplary language. PO Resp. 24. According to Patent Owner, the phrase “for instance, the running of an application on a server as requested by a client” is the express definition of “conversational flow” that we must accept, even though it contains the exemplary language “for instance.” *Id.* We do not agree because, in *Sinorgchem*, the patent at issue described “at least six different solvents,” of which aniline was just one example. The Federal Circuit reasoned that, *when* aniline was used as the solvent, *then* the upper limit of protic material was “up to about 4% H₂O.” *Sinorgchem*, 511 F.3d at 1138. In other words, the use of aniline was a condition precedent (“when aniline is utilized”) that, when satisfied, triggered the condition subsequent upper limit of protic material (“up to about 4% H₂O”). *Id.* The language in the ’099 patent (“for instance, the running of an application on a server as requested by a client”)—unlike that in *Sinorgchem*—is not

conditional. Thus, we find *Sinorgchem* to be inapposite to the facts of this case.

Finally, Patent Owner’s argument that “[b]efore the Institution Decisions in this and the related IPRs, every tribunal to have considered the proper construction for ‘conversational flow’ has accepted . . . the same construction advanced by Patent Owner,” PO Resp. 24–25, does not persuade us that our construction here is erroneous.

Despite Patent Owner’s argument, neither the District Court nor the Federal Circuit appears to have expressly analyzed “conversational flow” and determined that the claim term necessarily includes the language recited within the “for instance,” “where some,” and “some” phrases. In *Packet Intelligence LLC v. NetScout Systems*, for example, the District Court merely adopted Patent Owner’s construction without analysis after the parties “reached agreement” at a hearing dated March 2, 2017. Ex. 1067, 6. And the Federal Circuit, if anything, appears to have relied on a definition of “conversational flow” lacking the additional phrases Patent Owner advances here. Ex. 2060, 3. Specifically, in describing “conversational flows,” the court stated that:

The specifications explain that it is more useful to identify and classify “conversational flows,” *defined as* “the sequence of packets that are exchanged in any direction as a result of an activity.”

Id. (citing Ex. 1001, 2:45–47) (emphasis added). Finally, we also observe that the Board’s constructions of “conversational flow” in prior proceedings were made in institution decisions and, thus, were merely preliminary. *See, e.g.*, Ex. 1056, 10 (interpreting “conversational flow” “*for purposes of this Decision*” (emphasis added)).

For these reasons, we have considered the constructions of the other panels and tribunals, but are not persuaded that our construction of “conversational flow” is mistaken or is inconsistent with those other constructions. *See* 37 C.F.R. § 42.100 (b) (“Any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the inter partes review proceeding *will be considered*.” (emphasis added)).

4. Summary

In summary, having considered the totality of the arguments and evidence anew at the close of trial, we determine that “conversational flow[s]” means a “sequence of packets that are exchanged in any direction as a result of an activity,” without the additional restriction that the conversational flow must be client- or user-specific.

D. The Prior Art

Before turning to Petitioner’s asserted grounds of unpatentability, we provide a brief summary of the asserted references.

1. Riddle (Ex. 1008)

Riddle relates to a method for automatically classifying packet flows for use in allocating bandwidth resources by a rule of assignment of a service level. Ex. 1008, 4:6–10. The method comprises applying individual instances of traffic classification paradigms to packet network flows based on selectable information obtaining from layers of a multi-layered communication protocol in order to define a characteristic class, then mapping the flow to the defined traffic class. *Id.* at 4:10–15. Figure 3 is reproduced below.

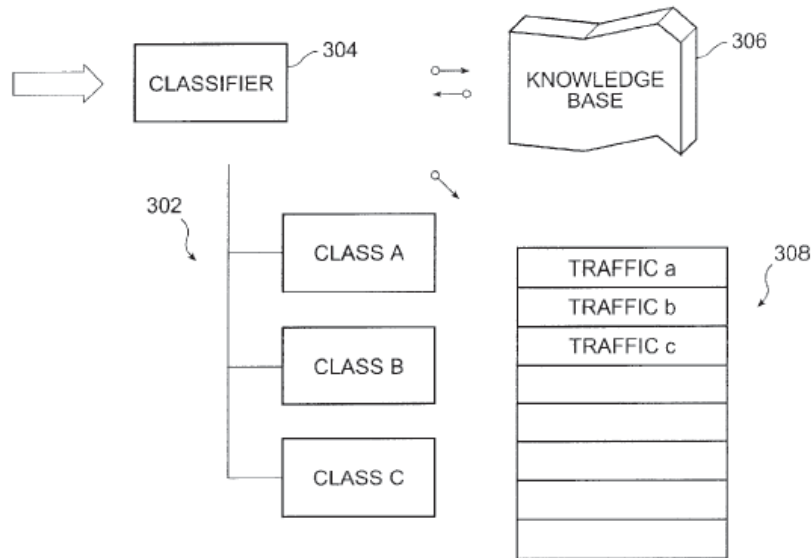


FIG. 3

Figure 3 illustrates a system for automatically classifying traffic.
Ex. 1008, 12:27–28.

With reference to Figure 3, traffic tree 302 classifies new traffic under a particular member class node. Ex. 1008, 12:28–30. Traffic classifier 304 detects services for incoming traffic. *Id.* at 12:30–31. Knowledge base 306 contains heuristics for determining traffic classes. *Id.* at 12:32–33. A plurality of saved lists 308 stores classified traffic pending incorporation into traffic tree 302. *Id.* at 12:37–38.

Figure 4A is reproduced below.

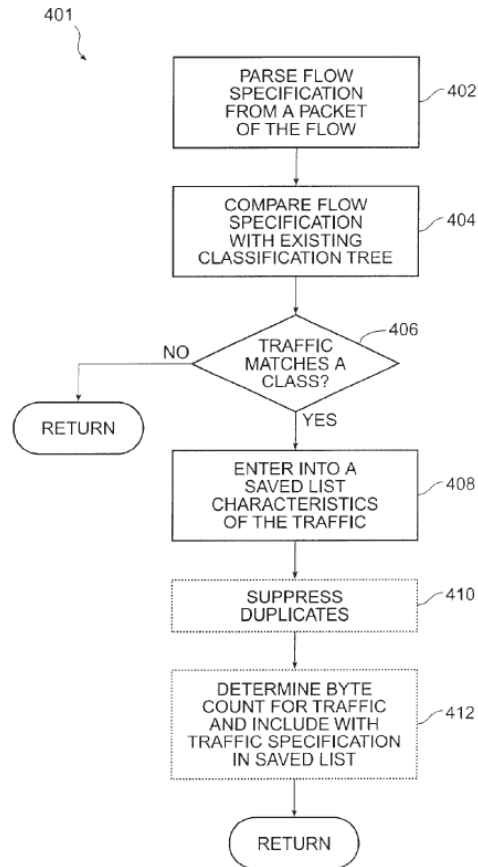


FIG. 4A

Figure 4A illustrates a flowchart 401 of processing steps for automatically classifying traffic. Ex. 1008, 12:42–43.

In step 402 shown in Figure 4A, a flow specification is parsed from the flow being classified. Ex. 1008, 12:43–44. Then in step 404, the flow specification parsed from the flow in step 402 is compared with the traffic specifications in each node of the classification tree. *Id.* at 12:44–47. In decisional step 406, a determination is made of whether traffic matches one of the classes being classified. *Id.* at 12:48–50. If this is so, then in step 408, an entry is made in a list of identifying characteristics, such as protocol type, IP protocol number, server port, traffic type, MIME type, or time of occurrence of traffic. *Id.* at 12:50–53.

Figure 4B is reproduced below.

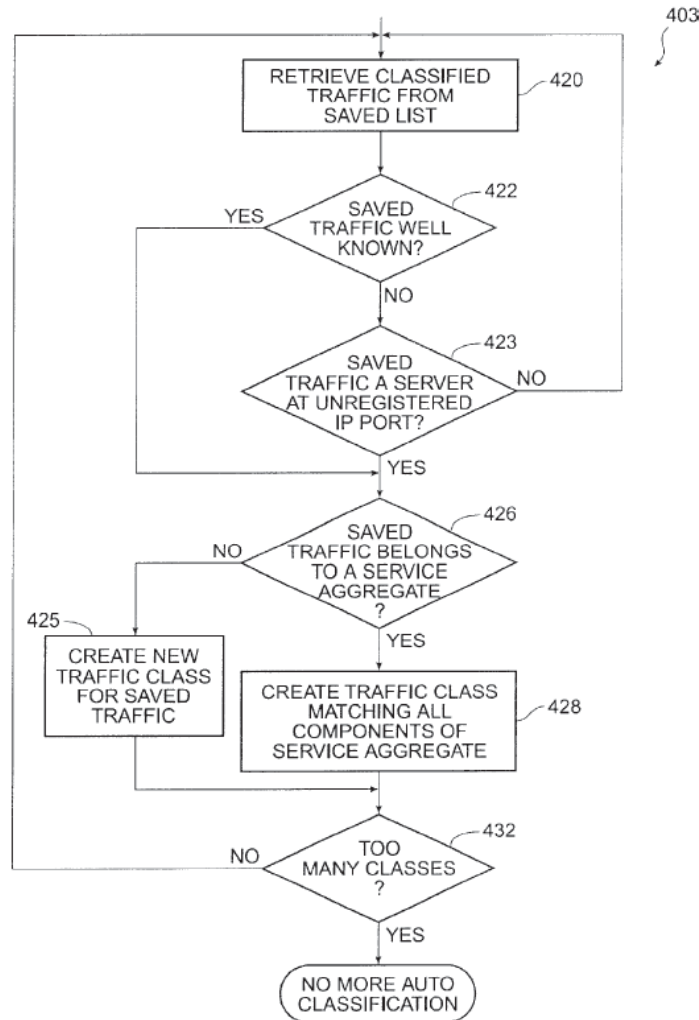


FIG. 4B

Figure 4B illustrates a flowchart 403 of the processing steps for integrating traffic classes into a classification tree. Ex. 1008, 13:36–38.

In step 420 of Figure 4B, an instance of saved traffic is received from a saved traffic list 308. Ex. 1008, 13:40–42. Next, in decisional step 422, the instance of saved traffic is examined to determine whether it is well-known and a name representing its type exists. *Id.* at 13:42–45. If this is so, then processing continues with a test of whether the saved traffic belongs to a service aggregate in step 426. *Id.* at 13:45–47. Otherwise, in step 423, the instance of saved traffic is examined to determine whether it

appears to be a server connection port of an unregistered IP port. *Id.* at 13:47–50. If this is not so, then processing continues with the next traffic class in the saved list in step 420. *Id.* at 13:51–52. In decisional step 426, the instance of saved traffic is examined to determine whether it belongs to a service aggregate. *Id.* at 13:52–54. If the traffic does belong to a service aggregate, then, in step 428, a traffic class is created which will match all components of the service aggregate. *Id.* at 13:57–59. In further step 425, a new traffic class is created to match the instance of saved traffic. *Id.* at 13:59–62.

2. *Ferdinand (Ex. 1009)*

Ferdinand relates to a system for “monitoring and managing communication networks for computers.” Ex. 1009, code (54), 1:3–4. Ferdinand discloses a monitoring system with “a Network Monitor 10 and a Management Workstation 12.” *Id.* at 11:32–12:1. In monitoring the network, Ferdinand indicates that a “statistical object represents a network parameter for which performance information is gathered,” and that Monitor 10 keeps information about monitored statistical objects in “Statistics Module (STATS) 36.” *Id.* at 22:18–22. STATS 36 is a database (*id.* at 19:5–11) and “defines the database and it contains subroutines for updating the statistics which it keeps” (*id.* at 28:14–15). Examples of data the database stores include records “per ip address,” “per ip pair,” “per udp pair,” “per ftp control connection,” and “per ftp data connection.” *Id.* at 29:3–30:7.

3. *Wakeman (Ex. 1014)*

Wakeman, titled “Forwarding Database Cache for Integrated Switch Controller,” describes a local access network (LAN) network switch that includes a random access memory (RAM) forwarding database (FDB)

containing address-to-port mappings for all devices connected to the switch's ports, as well as at least one CAM-cache connected to one or more of the switch's ports. Ex. 1014, codes (54), (57). By way of background, Wakeman explains that LAN network switches typically include a switch engine (SE), an FDB, and one or more dozens of ports, where the FDB may be implemented either as a hardware CAM or as a RAM. *Id.* at 1:18–23, 1:55–56. According to Wakeman, a hardware CAM is “very fast,” but “can be prohibitively expensive,” whereas RAM “can be implemented at a fraction of the cost of such hardware CAM” but is “typically too slow to keep up” with a network switch's SE. *Id.* at 1:56–67. By including both a RAM FDB and a CAM-cache having an access time much faster than that of the FDB, Wakeman's switch purportedly overcomes the problems in the prior art. *Id.* at 2:22–30; *see also id.* at 2:15–18 (citing a need for a network switch that is “not confined by the rigid balancing between the superior performance of a CAM database and the cost savings of a RAM database”).

4. *Yu (Ex. 1011)*

Yu relates to “an architecture 100 for applying policies to network data traffic.” Ex. 1011, 2:46–50. The architecture includes three components: (i) an application “such as a firewall, virtual private network (VPN), or traffic management,” (ii) a “policy engine,” and (iii) an API between these two components. *Id.* at 2:51–62.

Yu describes a “flow classification specification 203a provides the screening criteria for the flow classifier logic 204 to sort network traffic into flows,” that “[a]ll packets that match the same flow classification specification 203a form a flow,” that “a flow is a stream of correlated packets to which policy decisions apply,” and that “a flow classifier 204 classifies the packet according to one or more classification

specifications 203a and finds one or more corresponding action specifications 203b.” Ex. 1011, 3:32–59. Yu further describes that a “stream is an ‘instantiation’ of a flow-packets that have the same source and destination address, source and destination port, and protocol type,” and “[p]ackets may be sorted into streams, and a flow may include one or more streams,” where “[a]ll packets belonging to the same stream are to be regulated by the same policy.” *Id.* at 4:2–9.

In Yu, “the stream classifier 207 matches the packets to a particular stream specification 208 and then, using the corresponding action specifications 210, activates the proper action processors 206.” Ex. 1011, 5:8–11.

5. RFC1945 (Ex. 1010)

RFC1945 is an informational specification, published by the Network Working Group, and concerns Hypertext Transfer Protocol 1.0. Ex. 1010, 1. The publication “reflects common usage of the protocol referred to as ‘HTTP/1.0’.” *Id.* The RFC defines several message headers, such as “Referer,” which “allows the client to specify, for the server’s benefit, the address (URI) of the resource from which the Request-URI was obtained,” and “Server,” which “contains information about the software used by the origin server to handle the request.” *Id.* at 44–45.

E. Obviousness over Riddle, Ferdinand, and Wakeman

Petitioner contends that claims 1–3, 7, 16, and 18 would have been obvious over the combination of Riddle, Ferdinand, and Wakeman. Pet. 17–80. Patent Owner opposes. PO Resp. 34–46, 53–57; Sur-reply 13–16, 18–22. Having considered the totality of the arguments and evidence, we find that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 16, and 18 are unpatentable as having been obvious over Riddle in view

of Ferdinand, but that Petitioner has not shown that claim 3 is unpatentable on this ground.

1. Independent Claims 1, 7, and 16

a. Preamble

The preambles of claims 1 and 7 of the '646 patent each recite “[a] packet monitor for examining packets passing through a connection point on a computer network, each packet conforming to one or more protocols.” Ex. 1003, 36:39–41, 37:61–63, 45 (Certificate of Correction dated Sept. 21, 2004). The preamble of claim 16 similarly recites “[a] method of examining packets passing through a connection point on a computer network, each packets [*sic*] conforming to one or more protocols.” *Id.* at 39:10–12.

To the extent that the preamble recitations are limiting, Petitioner persuasively shows that they are taught by Riddle. *See* Pet. 30–33 (citing Ex. 1006 ¶¶ 263–269, 617–623, 686, 687). In particular, Petitioner contends that Riddle’s classifier operates in a network-connected computer system (e.g., in a server acting as a packet monitor and a network interface acting as a packet acquisition device) and parses and examines (or analyzes) traffic flow packets passing through a network. *Id.* at 30–31 (citing Ex. 1008, code (57), 1:57–61, 4:6–17, 5:53–67, 7:21–24, 12:27–41, 14:22–40, Fig. 3; Ex. 1006 ¶¶ 617, 618). Regarding “connection point[s],” Petitioner contends, “the ’646 [p]atent acknowledges the packet monitor connects to the network at these points,” and “Riddle’s packet monitor connects to [a] network connection . . . via a system gateway.” *Id.* at 32 (citing Ex. 1003, 4:54–5:8, Fig. 1; Ex. 1008, 5:53–67, 6:9–15, 7:21–24, Figs. 1A, 1B; Ex. 1006 ¶ 619). Further, Petitioner contends, “[f]or networks connecting multiple clients and servers . . . , Riddle teaches examining packets via ‘network routing means’ and/or routers,” which we agree with Petitioner

also serve as “connection point[s]” as claimed. *Id.* (citing Ex. 1008, 7:10–34, Figs. 1C, 3; Ex. 1006 ¶ 619). Still further, Petitioner contends that “Riddle discloses ‘each packet conforming to one or more protocols’ because it ‘relates to digital packet telecommunications, and particularly to management of network bandwidth based on information ascertainable from multiple layers of OSI network model,’” and that, “[f]or packet transmissions, Riddle’s Figure 1D shows ISO network model diagramming the relationship between layers of the TCP/IP protocol suite (e.g., the application, transport, network, data link, and physical layers (80–88)).” *Id.* at 33 (citing Ex. 1008, 1:54–57, 7:35–8:46, Fig. 1D; Ex. 1006 ¶¶ 620–623).

Patent Owner does not substantively address these assertions or otherwise contend that the art lacks any of the preamble features, and we are persuaded that Petitioner has shown by a preponderance of the evidence that they are taught by Riddle and adopt the contentions set forth in the Petition and in Dr. Weissman’s Declaration as mapped to these undisputed limitations of claims 1, 7, and 16 as our own findings. *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (explaining that the Board need not make specific findings about claim limitations that a patent owner does not dispute are disclosed in the prior art).

b. Packet Acquisition Device Limitations (Claims 1, 7, and 16)

Claims 1 and 7 of the ’646 patent each recite, in part, “a packet acquisition device coupled to the connection point and configured to receive packets passing through the connection point.” Ex. 1003, 36:43–45, 37:65–67. Claim 16 similarly recites “receiving a packet from a packet acquisition device.” *Id.* at 39:14.

Petitioner demonstrates by a preponderance of the evidence that Riddle teaches these limitations. *See* Pet. 34–36 (citing Ex. 1006 ¶¶ 263–269, 624–626, 688), 77. In particular, Petitioner identifies various “packet acquisition devices coupled to a connection point” in Riddle, including network interface 40 connected to the system gateway depicted in Riddle’s Figures 1A and 1B, as well as the “network routing means” and router 75 depicted in Riddle’s Figure 1C. *Id.* at 34 (citing Ex. 1008, 6:1–23, 7:21–24, 16:54–17:15 (claim 8), Figs. 1A–1C; Ex. 1006 ¶¶ 264–266). Citing disclosure in Riddle describing automatically classifying packet flows to help allocate bandwidth resources and “to classify a complete enumeration of the possible traffic,” and further relying on the testimony of Dr. Weissman, Petitioner contends that a person of ordinary skill in the art “would have understood that Riddle’s packet acquisition device is configured to receive packets.” *Id.* at 35–36 (citing Ex. 1008, code (57), 4:7–17, 4:55–60; Ex. 1006 ¶ 625). Patent Owner does not dispute Petitioner’s contentions regarding these limitations. *See generally* PO Resp.

Petitioner’s assertions are supported by the cited evidence and are persuasive. Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitations are taught by Riddle and adopt the contentions set forth in the Petition and in Dr. Weissman’s Declaration as mapped to these undisputed limitations of claims 1, 7, and 16 as our own findings. *NuVasive*, 841 F.3d at 974.

c. Input Buffer Memory Limitation (Claim 7)

Claim 7 of the ’646 patent recites, in part, “an input buffer memory coupled to and configured to accept a packet from the packet acquisition device.” Ex. 1003, 38:1–2.

Relying on the testimony of Dr. Weissman, Petitioner contends, and we agree, that Riddle discloses this limitation or renders it obvious in view of Ferdinand, contending that a person of ordinary skill in the art would have understood that packet queues in Riddle's router function as buffers, or, alternatively, that a person of ordinary skill in the art would have been motivated and found it obvious to include an input buffer memory in Riddle's memory storage based either on the artisan's own knowledge or Ferdinand's teachings. Pet. 36–37 (citing Ex. 1008, code (57), 2:51–55, 4:15–17, 6:1–23, 7:21–24, 16:54–17:15 (claim 8), Figs. 1A, 1B; Ex. 1003, 18:41–51; Ex. 1009, 26:2–7, 41:17–31, 49:2–12; Ex. 1006 ¶¶ 270–276, 625, 689–691; Ex. 1031, 1:54–2:3).

Petitioner further contends that the person of ordinary skill in the art would have been motivated, based on Ferdinand's teachings, to “modify Riddle's monitor with input buffer memory to temporarily store received packets and improve performance by limiting packet drops,” and that including such input buffer memory in a packet acquisition device in accordance with Riddle's and Ferdinand's teachings “amounts to nothing more than combining known prior-art technologies used in their ordinary and predictable manner to queue packet traffic.” *Id.* at 37–38 (citing Ex. 1006 ¶ 691). With respect to reasons to combine the teachings of Riddle and Ferdinand, Petitioner contends that “Riddle and Ferdinand are in the same field of endeavor,” “contain overlapping disclosures with similar purposes,” and illustrate that it was well-known and ubiquitous in the art for networking devices to include database storage structures, such as buffers. *Id.* at 25 (citing Ex. 1008, 4:7–17, 9:14–27, 12:37–59, Figs. 3, 4A, 4B; Ex. 1009, 12:3–9; Ex. 1006 ¶¶ 256, 257).

Patent Owner does not dispute Petitioner's contentions regarding this limitation. *See generally* PO Resp.

Petitioner's assertions are supported by the cited evidence and are persuasive. Moreover, we are persuaded that a person of ordinary skill in the art would have been motivated to combine the teachings of Riddle and Ferdinand as proposed by Petitioner and supported by the testimony of Dr. Weissman. *See* Pet. 25–27 (citing Ex. 1008 ¶¶ 256–257, 259). Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitations are taught by the combination of Riddle and Ferdinand and adopt the contentions set forth in the Petition and in Dr. Weissman's Declaration as mapped to these undisputed limitations of claim 7 as our own findings. *NuVasive*, 841 F.3d at 974.

d. Parser Record Limitations (Claims 7 and 16)

Claim 7 of the '646 patent recites, in part, “a parser subsystem coupled to the input buffer memory, the parsing subsystem configured to extract selected portions of the accepted packet and to output a parser record containing the selected portions.” Ex. 1003, 38:3–6. Claim 16 similarly recites “performing one or more parsing/extraction operations on the packet to create a parser record comprising a function of selected portions of the packet.” *Id.* at 39:15–17.

Relying on disclosure in Riddle of a processor programmed to perform parsing/extraction operations and coupled to memory, Petitioner persuasively shows that Riddle discloses a parser subsystem, as recited in claim 7, as well as the corresponding parsing/extraction step of claim 16. Pet. 38 (citing Ex. 1006 ¶¶ 294–327, 691–700; Ex. 1008, 6:1–15, 16:61–62 (claim 8), Fig. 1A), 77. Specifically, Riddle teaches “a processor means operative to: parse a packet into a first flow specification” and illustrates in

Figure 1A that processor 30 is coupled to memory subsystem 35. Ex. 1008, 16:61–62 (claim 8), 6:1–15, Fig. 1A. Riddle teaches that processor 30 comprises a parser subsystem that applies “individual instances of traffic classification paradigms to packet network flows based on selectable information obtained from a plurality of layers of a multi-layered communication protocol in order to define a characteristic class, then mapping the flow to the defined traffic class.” *Id.* at 4:10–15. And Riddle teaches that the parser extracts identifying characteristics (i.e., a signature for the flow) such as patterns and/or reference strings from headers. *Id.* at 8:67–9:27, 12:42–59. Thus, we agree with Petitioner that Riddle teaches a parser subsystem coupled to memory that extracts packet portions. Pet. 39–40 (citing Ex. 1008, 4:10–15, 9:28–42, 12:26–41, 12:42–53, 15:55–16:14 (claim 1), 17:21–18:16 (claim 11), Fig. 4A; Ex. 1006 ¶¶ 693–696). Further, Petitioner persuasively shows that Riddle discloses outputting parser records containing the selected portions in the same way as disclosed by the ’646 patent. *Id.* at 41 (citing Ex. 1003, 9:29–39; Ex. 1008, 8:67–9:27, 12:42–59; Ex. 1006 ¶¶ 697, 698). Patent Owner does not dispute Petitioner’s contentions regarding these limitations. *See generally* PO Resp.

Petitioner’s assertions are supported by the cited evidence and are persuasive. Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that these limitations are taught by Riddle and adopt the contentions set forth in the Petition and in Dr. Weissman’s Declaration as mapped to these undisputed limitations of claims 7 and 16 as our own findings. *NuVasive*, 841 F.3d at 974.

e. Flow-Entry Database Limitations (Claims 1, 7, and 16)

Claim 1 of the ’646 patent recites, in part, “a memory for storing a database comprising flow-entries for previously encountered conversational

flows to which a received packet may belong, a conversational flow being an exchange of one or more packets in any direction as a result of an activity corresponding to the flow.” Ex. 1003, 36:46–51. Claim 7 similarly recites “a memory for storing a database of one or more flow-entries for any previously encountered conversational flows, each flow-entry identified by identifying information stored in the flow-entry;” and claim 16 recites “looking up a flow-entry database comprising none or more flow-entries for previously encountered conversational flows, the looking up using at least some of the selected packet portions and determining if the packet is of an existing flow, the lookup being via a cache.” *Id.* at 38:7–10, 39:18–22, 47 (Certificate of Correction dated Oct. 15, 2013).

(1) The Parties’ Arguments

Petitioner contends, and we agree, that Riddle alone or in view of Ferdinand renders these limitations obvious. Pet. 42–57, 77–78. More particularly, with respect to the recited “memory for storing . . . flow-entries” limitation, Petitioner contends that Riddle’s monitor includes a storage subsystem and stores flow-entry lists of previously encountered flows in a series of lists that include a plurality of flow-entries encountered by the monitor. Pet. 42–43 (citing Ex. 1006 ¶¶ 328–339, 628; Ex. 1008, 6:1–23, 6:43–50, 12:37–59, Figs. 1A, 1B, 3). According to Petitioner, Riddle incorporates the saved lists into a classification tree, where each node of the tree represents a traffic class. *Id.* at 43 (citing Ex. 1008, 8:47–50, 9:28–33, Fig. 3). Relying on the testimony of Dr. Weissman, Petitioner contends that a person of ordinary skill in the art would have understood that Riddle’s saved lists “store flow-entries in memory.” *Id.* at 44 (citing Ex. 1006 ¶¶ 330–334, 628–630).

Further, Petitioner contends, “Riddle identifies a ‘service aggregate’ which is one type of traffic.” Pet. 45 (citing Ex. 1006 ¶ 331; Ex. 1008, 11:10–22, 13:53–59). Petitioner argues that Riddle’s “service aggregate links together into a ‘conversation’ multiple connection flows based on specific software program activity (e.g., PointCast traffic),” and, “[a]ccordingly, Riddle teaches storing separate entries for encountered conversational flows.” *Id.* (citing Ex. 1006 ¶ 331; Ex. 1008, 11:60–63). Additionally, Petitioner contends, Riddle illustrates processing of the flow-entries to determine whether a traffic class, such as a service aggregate, needs to be created for the flow, and that Riddle’s monitor retrieves previously stored data from the saved lists, tests whether the retrieved traffic belongs to a service aggregate, and if so, creates a traffic class that “will match all components of the service aggregate.” *Id.* (citing Ex. 1006 ¶¶ 332, 333, 628; Ex. 1008, 4:49–51, 13:35–14:6, Fig. 4B). According to Petitioner, a person of ordinary skill in the art would have been motivated and would have found it obvious to store Riddle’s lists and related tree in a flow-entry database, based either on the artisan’s own knowledge of network devices or on Ferdinand’s teachings, in order, for example, to increase functionalities in furtherance of Riddle’s desired goal of determining whether the packet monitor has received duplicate flow-entries. *Id.* at 46–48 (citing, e.g., Ex. 1006 ¶¶ 335–339, 631; Ex. 1008, 6:1–15, 12:32–35, 12:53–57, 15:1–15, Fig. 4A; Ex. 1009, 28:14–17).

Petitioner further contends that Riddle discloses flow-entries of “previously encountered conversational flows” in at least two ways: “(a) classifying based on service aggregates and (b) classifying based on PointCast.” Pet. 49 (citing Ex. 1006 ¶¶ 297–327, 632–635). Regarding the former, Petitioner contends that “Riddle teaches identifying whether packets

are part of ‘service aggregates,’ i.e., traffic classes linking separate connection flows based on the associated application,” and that “these ‘service aggregates’ meet the claimed ‘conversational flow.’” *Id.* (citing Ex. 1006 ¶¶ 303–315, 632). Indeed, Petitioner contends, Riddle’s claims 1 and 2 teach that the service aggregates are conversational flows. *Id.* at 53–54 (citing Ex. 1008, 15:56–16:14 (claim 1) (reciting “said network having any number of flows” and “parsing a packet into a first flow specification”), 16:15–26 (claim 2) (reciting “for at least a second flow having a second flow specification, recognizing said second flow specification and said first flow specification to comprise together a service aggregate” and “associating said first flow specification and said second flow specification with a newly-created classification tree node, said newly-created classification tree type node having a first traffic specification corresponding to said first flow specification and a second traffic specification corresponding to said second flow specification”); Ex. 1006 ¶ 313).

Regarding “PointCast Traffic,” Petitioner contends that the provisional application, from which the ’646 patent claims priority and which is incorporated by reference in the ’646 patent, expressly “specifies that PointCast traffic flows include an identification signature, and that identifying PointCast traffic is an example of identifying a conversational flow.” Pet. 55 (citing Ex. 1016, 7:16–25; Ex. 1006 ¶¶ 320–322). Because Riddle “creates a single traffic class for disjointed PointCast connection flows by searching headers for URLs that begin with ‘/FIDO-1/,’” Petitioner contends, “Riddle thus teaches identifying a conversational flow.” *Id.* at 55–56 (citing Ex. 1006 ¶¶ 323, 324; Ex. 1008, 11:57–12:9). Indeed, Petitioner asserts, one of the inventors of the ’646 patent previously testified that creating a single flow to describe such disjointed flows is a type of

conversational flow. *Id.* at 56 (citing Ex. 1068, 55:11–57:15; Ex. 1071 ¶ 4; Ex. 1072, 3). Finally, Petitioner contends, “Riddle teaches that one of its autoclassification processes identifies PointCast traffic using the outside service field of the class, specifying that “[c]ertain traffic may be distinguished by a signature,” and accordingly, based on Riddle’s teachings, a person of ordinary skill in the art “would have understood that Riddle stores flow-entries for ‘previously encountered conversational flows’ such as PointCast traffic.”” *Id.* (citing Ex. 1008, 11:50–53, 14:54–63, 15:28–31; Ex. 1006 ¶¶ 325, 328–339, 634, 636).

Lastly, Petitioner contends that Riddle teaches “each flow-entry identified by identifying information stored in the flow-entry” as claimed, because Riddle enters characteristics of the traffic flow into the saved list (step 408), which identifying information includes “a flow specification and indicators.” *Id.* at 57 (citing, *e.g.*, Ex. 1008, 12:42–59, Figs. 4A–4B; Ex. 1006 ¶¶ 701–704).

In response to Petitioner’s contentions, Patent Owner asserts, first, that Riddle fails to teach “conversational flows” (PO Resp. 34–45), and second, that the combination of Riddle and Ferdinand does not teach the claimed flow-entry database (*id.* at 45–46). Regarding the first point, Patent Owner contends that Riddle classifies traffic into generic traffic classes, but does not perform any more granular analysis. *Id.* at 40. According to Patent Owner, Riddle has no need or ability to recognize whether a particular group of packets in one direction relate to another flow or may form part of a conversational flow implicating an activity, unlike the claims of the ’646 patent “which require specific operations involving conversational flows.” *Id.* Further, according to Patent Owner, “just because Riddle discloses a traffic classification activity does not mean that it discloses or suggests the

specific activity required in the '646 Patent, which is narrowly focused on conversational flows.” *Id.* at 41–42. Patent Owner contends, “Riddle combines flows based on the type of activity,” and “[a]t best, . . . combines flows of the same type into a traffic class,” whereas “the '646 Patent inventions recognize separate conversational flows even when these different flows are based on the same type of activity.” *Id.* at 42–43. Still further, Patent Owner argues, “‘conversational flows’ include bidirectional exchanges of packets,” but “Riddle, however, expressly teaches that its traffic classes are limited to unidirectional traffic.” *Id.* at 44 (emphasis omitted) (citing Ex. 1008, 8:50–53, 11:28–29, 13:57–59; Ex. 2061 ¶¶ 64, 65, 83). According to Patent Owner, “[b]ecause Riddle’s traffic classes are unidirectional, they cannot satisfy the ‘conversational flow’ element required in every challenged claim.” *Id.* at 44–45.

Regarding the recited flow-entry database, Patent Owner contends that Riddle does not use conversational flows and accordingly has no disclosure of the recited flow-entry database “comprising flow-entries for previously encountered conversational flows.” PO Resp. 45 (citing Ex. 2061 ¶ 87). Further, Patent Owner contends, although the Petition relies on the combination of Riddle and Ferdinand as teaching this limitation, “Ferdinand . . . focuses on a ‘technique of organizing and displaying network performance statistics’” and “never discloses or suggests storing ‘flow-entries for previously encountered conversational flows.’” *Id.* (citing Ex. 1009, 7:17–18, 8:3–5). “Nor would Ferdinand have reason to implement such a solution,” according to Patent Owner, “because its goal is merely to keep count,” which “[i]t can do . . . by the standard statistical measures described in the specification.” *Id.* at 45–46.

In its Reply, Petitioner contends that Patent Owner’s arguments do not analyze Riddle under the Board’s construction of “conversational flows,” but instead under Patent Owner’s own incorrect construction. Reply 10–11. Regardless, Petitioner argues, Riddle discloses “conversational flows” even under Patent Owner’s incorrect construction. *Id.* at 11. First, according to Petitioner, “Riddle specifies that its service aggregate ‘is provided for certain applications that use more than one connection in a *particular* conversation between *a client and a server*.’” *Id.* (citing Ex. 1008, 11:10–19). For example, “Riddle describes listing service aggregates based on their source and/or destination, e.g., ‘host1,’ where host1 can represent a client or a server involved in an FTP flow.” *Id.* at 11–12 (citing Ex. 1008, 2:13–21, 7:12–21, 13:8–26, Fig. 1C; Ex. 1006 ¶¶ 311, 312, 632, 633). Further, Petitioner contends, “Riddle teaches defining a traffic class by URI-pattern (e.g., ‘/sales/*’) and by the specific client/server pair involved (e.g., from ‘client Z’ to ‘server Y’).” *Id.* at 12 (citing Ex. 1008, 8:58–9:11; Pet. 70–71, 94–95).

In response to Patent Owner’s contention that Riddle classifies inbound and outbound flows only separately, not bidirectionally, Petitioner contends that Riddle in fact discloses that all traffic in a particular conversation between a client and a service is classified into a single service aggregate. Reply 13 (citing Ex. 1008, 11:12–15; Pet. 49–50). Petitioner cites, for example, disclosure in Riddle that the service aggregate for an FTP session contains “each conversation” between the client and server for the session, which Petitioner argues refers to all packets exchanged in either direction. *Id.* (citing Ex. 1008, 11:13–19, 12:1–12, 13:54–59; Pet. 50–51). Still further, Petitioner argues that “Riddle isn’t limited to flow classification based on port or server identity,” but discloses, for example, that “flow

classification can use port numbers and can further ‘extend to examination of the data contained in a flow’s packets’ via signature-based analysis.” *Id.* at 14 (citing Ex. 1008, 11:50–53). Petitioner contends that “Telnet traffic’s multi-packet ‘option negotiations’ ‘may indicate an appropriate class,’ an example of classification from exchanged data, not port number.” *Id.* (citing Ex. 1008, 11:66–67).

Lastly, in response to Patent Owner’s arguments that “Riddle . . . has no disclosure of a flow-entry database” and that “Ferdinand never discloses or suggests storing ‘flow-entries for previously encountered conversational flows’” (PO Resp. 45–46), Petitioner argues, first, that Patent Owner does not address the Petition’s contention that, “based upon a [person of ordinary skill in the art’s] knowledge of network devices, a [person of ordinary skill in the art] would have been motivated and found it obvious to store Riddle’s classification information, such as flow-entry lists 308, in a database.” Reply 18 (citing Pet. 46–47; Ex. 1006 ¶¶ 328–335, 629). Petitioner further points out that the Petition alleges that the “flow-entry database” limitations would have been obvious over “Riddle alone or in combination with Ferdinand,” not based on Ferdinand alone, and accordingly, Petitioner contends, Patent Owner’s attack on Ferdinand individually is irrelevant to the trial ground. *Id.* at 18–19 (citing Pet. 23–27, 46–48). Citing the arguments presented in the Petition, Petitioner argues that “[t]he ‘flow-entry database’ limitations would have been obvious in view of Riddle’s teachings regarding flow-entries and relational databases based on Ferdinand’s teachings regarding statistics databases for storing flow classification information.” *Id.* at 19 (citing Pet. 23–27, 46–48).

In the Sur-reply, Patent Owner argues again that Riddle fails to disclose “conversational flows,” contending that Riddle does not classify

activities based on a particular client, that Riddle categorizes inbound and outbound traffic separately, and that Riddle fails to distinguish between different activities of the same type. Sur-reply 13–16. First, according to Patent Owner, Petitioner’s contention that a service aggregate can distinguish between the same type of activity between different clients (Reply 11–12) “hinges on an extrapolation of how a single connection example is classified that is not supported by the rest of the specification.” Sur-reply 13. According to Patent Owner:

In Riddle, service aggregates are a “common traffic class” that are “created with a plurality of traffic specifications.” EX1008 at 11:15–23. Riddle notes “[a] traffic class is broadly defined as traffic between *one or more clients* and *one or more servers*.” *Id.* at 8:48–49, 14:18–20 (“[A]nother method of identifying an individual traffic class is to detect simultaneous connections to the same host port from different clients.”). Thus, Riddle does not classify traffic per user, but by the type of traffic based on properties such as the ports being used. This understanding reflects Riddle’s stated purpose—bandwidth management.

Petitioner also suggests that, because a traffic class can be defined in terms of a specific source or destination IP address, . . . Riddle discloses “classifying traffic into client-specific conversational flows.” Reply at 11–12 (citing Riddle at 8:58–9:11, 10:1–17). That is incorrect. A rule written specifically for a client’s IP address would not distinguish one client activity from another; it would simply aggregate all traffic for that client. Defining a traffic class in terms of a specific source or destination address is an implementation of the conventional technique of matching one or more parts of a 5-tuple—but not a conversational flow. PO [Resp.] 6, 18–19; EX2061 ¶¶62–65, 81–83.

Id. at 13–14 (first and second alterations in original). Further, Patent Owner argues, “Riddle expressly teaches that its traffic classes are limited to unidirectional traffic, and that service aggregates are traffic classes.” *Id.* at 15. Finally, with regard to the recited “flow-entry database,” Patent

Owner responds that, notwithstanding Petitioner’s arguments that implementing these limitations would have been obvious, “Petitioner provided no evidence or argument to show it would have been ‘unusually simple’ to add the claimed limitations, nor that the technology is ‘particularly straightforward.’” *Id.* at 20–21. According to Patent Owner, “[t]he challenged claims do not recite a database generally, but recite a flow-entry database specifically adapted for use in a packet monitor,” and a person of ordinary skill in the art “would have understood the statistics database of Ferdinand to serve a very different purpose than the claimed flow-entry database.” *Id.* at 21.

(2) *Analysis*

Having considered the full trial record, we are persuaded that Petitioner has shown by a preponderance of the evidence that the combination of Riddle and Ferdinand renders obvious the recited flow-entry database limitations in view of the proper construction of “conversational flow.” *See supra* § III.C. Petitioner’s assertions, which we adopt, are supported by the cited evidence and are persuasive. Moreover, we are persuaded that a person of ordinary skill in the art would have been motivated to combine the teachings of Riddle and Ferdinand as proposed by Petitioner and supported by the testimony of Dr. Weissman. *See* Pet. 25–27 (citing Ex. 1006 ¶¶ 256–257, 259).

As an initial matter, for the reasons set forth in Section III.C above, we conclude that the term “conversational flow” is not client- or user-specific. Further, notwithstanding Patent Owner’s arguments that Riddle is concerned with bandwidth management rather than network monitoring (*see* PO Resp. 40–43; Sur-reply 13–14), obviousness does not require that the prior art address the same problem identified by the patent. *See KSR*, 550

U.S. at 419 (“[N]either the particular motivation nor the avowed purpose of the patentee controls What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid.”); *Outdry Techs. Corp. v. Geox S.p.A.*, 859 F.3d 1364, 1371 (Fed. Cir. 2017) (“The motivation supported by the record . . . need not be the same motivation articulated in the patent.”).

Further, contrary to Patent Owner’s contentions (PO Resp. 44; Sur-reply 15), neither the Board’s construction of “conversational flow” nor Patent Owner’s proposed construction *requires* “bidirectional” exchanges of packets (*see supra* § III.C; PO Resp. 23–26). Both the Board’s adopted construction and Patent Owner’s proposed construction recite, *inter alia*, “the sequence of packets that are exchanged *in any direction* as a result of an activity.” *Supra* § III.C (emphasis added); PO Resp. 23–26. The phrase “in any direction” is not limited to bidirectional packet flows but also encompasses unidirectional flows. As Petitioner points out, this interpretation is consistent with the declaration of Patent Owner’s expert, Ms. Quigley, stating that conversational flows “can,” rather than “must,” include bidirectional exchanges. Ex. 2061 ¶ 83 (cited in Reply 13 n.41). Regardless, we further agree with Petitioner that Riddle’s disclosure that all traffic in a particular conversation between a client and a server is classified into a single service aggregate teaches bidirectional exchange. Reply 13 (citing Ex. 1008, 11:12–19, 12:1–12, 13:54–59); *see also* Pet. 49–51 (mapping Riddle’s service aggregates to the claimed conversational flows and stating that Riddle’s “Table 3 specifies detecting services in ‘both directions’”).

Having concluded that Riddle teaches the recited conversational flows, we are further persuaded by Petitioner’s arguments that a person of

ordinary skill in the art would have found it obvious in view of the combined teachings of Riddle and Ferdinand to store flow-entries for previously encountered conversational flows in a database. *See* Pet. 46–48. Riddle discloses storing flow entries in its series of lists 308 that include a plurality of flow-entries encountered by the monitor, and Petitioner persuasively argues with the support of Dr. Weissman’s testimony that a person of ordinary skill in the art would have been motivated, based either on Riddle’s own disclosure of relational database 306 or on the teachings of Ferdinand, to implement Riddle’s saved flow-entries in a database, in order, for example, to increase functionalities in furtherance of Riddle’s desired goal of determining whether the packet monitor has received duplicate flow-entries. *See id.* (citing, e.g., Ex. 1008, 6:1–15, 10:1–18 (Table 2), 12:32–38, 12:53–57, 12:61–13:9, 14:1–5, 15:1–15, Fig. 4A; Ex. 1009, 23:19–23, 27:16–19, 28:14–24, 54:13–17, 60:10–15, Fig. 22; Ex. 1006 ¶¶ 335–339, 631). Because the asserted ground is based on the combination of Riddle and Ferdinand, Patent Owner’s arguments that Ferdinand does not individually teach storing flow-entries in a database are unpersuasive. *See Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (holding that arguments that “attack the disclosures of the two references individually” cannot overcome a ground premised on the combination of those references (citing *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”))).

Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitations are taught by the combination of Riddle and Ferdinand.

f. Cache Subsystem Limitations (Claims 1 and 7)

Claim 1 of the '646 patent recites, in part, “a cache subsystem coupled to the flow-entry database memory providing for fast access of flow-entries from the flow-entry database.” Ex. 1003, 36:52–54. Claim 7 similarly recites “a cache subsystem coupled to and between the lookup engine and the flow-entry database memory providing for fast access of a set of likely-to-be-accessed flow-entries from the flow-entry database.” *Id.* at 38:19–22.

Petitioner contends Riddle in view of Ferdinand or Wakeman renders these limitations obvious, based on Riddle’s disclosure of examining flow-entries from stored flow-entry lists (*see supra* § III.E.1.e), together with Ferdinand’s or Wakeman’s cache systems. Pet. 57–59 (citing Ex. 1006 ¶¶ 627–648, 668–671, 707–714; Ex. 1008, 13:40–47; Ex. 1009, 18:27–29, 28:14–21; Ex. 1014, 1:20–28, 1:55–67, 2:31–49, 3:36–45, 4:31–40, 5:22–27, Figs. 2, 3). Patent Owner does not dispute Petitioner’s contentions regarding these limitations. *See generally* PO Resp.

Petitioner’s assertions are supported by the cited evidence and are persuasive. Moreover, we are persuaded that a person of ordinary skill in the art would have been motivated to combine the teachings of Riddle and Ferdinand or Wakeman as proposed by Petitioner and supported by the testimony of Dr. Weissman. *See* Pet. 25–27 (citing Ex. 1008 ¶¶ 256–257, 259), 29–30 (citing Ex. 1008 ¶¶ 185–191, 613–616). Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitations are taught by the combination of Riddle and Ferdinand or the combination of Riddle and Wakeman.

g. Lookup Engine Limitations (Claims 1 and 7)

Claim 1 of the '646 patent recites, in part, “a lookup engine coupled to the packet acquisition device and to the cache subsystem and configured to

lookup whether a received packet belongs to a flow-entry in the flow-entry database, the looking up being via the cache subsystem.” Ex. 1003, 36:55–59, 47 (Certificate of Correction dated Oct. 15, 2013). Claim 7 similarly recites “a lookup engine coupled to the output of the parser subsystem and to the flow-entry memory and configured to lookup whether the particular packet whose parser record is output by the parser subsystem has a matching flow-entry, the looking up using at least some of the selected packet portions and determining if the packet is of an existing flow.” *Id.* at 38:12–18.

Petitioner contends Riddle in view of Ferdinand or Wakeman renders these limitations obvious. Pet. 59 (citing Ex. 1006 ¶¶ 340–344, 649–652, 705, 706). Referring back to its contentions with respect to the flow-entry database limitations of claims 1 and 7 (*see supra* § III.E.1.e), Petitioner contends that “Riddle looks up whether a flow matches a traffic class in relation to classifying a service aggregate based on a plurality of indicators” and “Riddle’s operations run on a processor having programming code performing lookup functions.” *Id.* at 60 (citing Ex. 1008, 5:53–57, 12:42–49, 13:42–47, 16:40–48 (claim 5), Fig. 4B; Ex. 1006 ¶¶ 340–344, 650, 692–700). Accordingly, Petitioner argues, relying on the testimony of Dr. Weissman, a person of ordinary skill in the art “would have understood Riddle’s processor and memory include a lookup engine,” where such “lookup engine is configured to determine whether a received packet belongs to a flow-entry in the flow-entry lists.” *Id.* at 60–61 (citing Ex. 1006 ¶¶ 340–344; Ex. 1008, 12:37–49, 16:54–17:15 (claim 8), Figs. 3, 4A, 4B). Still further, Petitioner contends, as discussed in connection with the “cache subsystem” claim elements (*see supra* § III.E.1.f), “Riddle in view of Ferdinand or Wakeman renders obvious a cache subsystem,” and a person of ordinary skill in the art “would have been motivated to modify Riddle’s

lookup engine to employ a cache subsystem as taught by Ferdinand or Wakeman, as this modification would improve Riddle's monitor by storing source and destination flow-entry addresses" and "would have understood that Riddle's looking up would be done via the cache subsystem" when including such a cache. *Id.* at 61 (citing Ex. 1006 ¶¶ 637–648, 653). Patent Owner does not dispute Petitioner's contentions regarding these limitations. *See generally* PO Resp.

Petitioner's assertions are supported by the cited evidence and are persuasive. Moreover, we are persuaded that a person of ordinary skill in the art would have been motivated to combine the teachings of Riddle with Ferdinand or Wakeman as proposed by Petitioner. *See* Pet. 25–27 (citing Ex. 1008 ¶¶ 256–257, 259), 29–30 (citing Ex. 1008 ¶¶ 185–191, 613–616). Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitations are taught by the combination of Riddle and Ferdinand or the combination of Riddle and Wakeman.

h. State Processor Limitation (Claim 1)

Claim 1 of the '646 patent recites, in part, "a state processor coupled to the lookup engine and to the flow-entry-database memory, the state processor being to perform any state operations specified for the state of the flow starting from the last encountered state of the flow in the case that the packet is from an existing flow, and to perform any state operations required for the initial state of the new flow in the case that the packet is not from an existing flow." Ex. 1003, 36:60–67, 47 (Certificate of Correction dated Oct. 15, 2013).

(1) The Parties' Arguments

Petitioner persuasively contends that Riddle alone or in view of Ferdinand or Wakeman renders this limitation obvious. Pet. 62 (citing

Ex. 1006 ¶¶ 654–671). First, Petitioner contends, it would have been obvious to use a database for Riddle’s memory storing flow-entry lists, for reasons discussed with respect to the “flow entry database” limitation of claim 1. *Id.*; *see supra* § III.E.1.e. Further, Petitioner contends, “Riddle discloses a state processor coupled to that memory where the processor performs state operations for existing and new flows.” *Id.* at 62–63 (citing Ex. 1006 ¶¶ 345–372, 378–393, 627–636, 654–657, 659, 660; Ex. 1008, 5:53–57, 9:28–41, 10:19–56, 12:42–13:23, 14:1–5, 15:56–16:14 (claim 1), Figs. 2A, 2B, 3, 4A). Relying on the testimony of Dr. Weissman, Petitioner asserts that a person of ordinary skill in the art “would have understood that Riddle’s processor, lookup engine, and flow-entry database memory work together to achieve the goal of classifying traffic, and therefore would be coupled together.” *Id.* at 63 (citing Ex. 1006 ¶ 657). Further, Petitioner contends, Riddle stores previously encountered flows and performs state operations on both existing and new conversational flows. *Id.* at 64–66 (citing Ex. 1006 ¶¶ 627–636, 662–671; Ex. 1008, 11:25–31, 12:30–13:22, 14:1–5, 18:26–28 (claim 15), Fig. 4A).

In response to Petitioner’s arguments, Patent Owner contends that the prior art does not teach conversational flow state-based analysis. PO Resp. 53–57. According to Patent Owner, “Riddle relates to classifying traffic based on an **individual packet** in the flow, rather than on a state of the flow (*i.e.*, evaluation across multiple packets).” *Id.* at 53. More particularly, Patent Owner contends, “Riddle views each packet as an independent and unique occurrence and focuses on evaluating that packet—in isolation—to determine whether a given category of traffic has encountered a ‘hit.’” *Id.* (citing Ex. 2061 ¶¶ 62–65, 80–83). According to Patent Owner, “[t]he teachings of Riddle relied on by Petitioner[] show Riddle stepping through a

hierarchical traffic class tree to classify a packet,” but “this analysis turns solely on an *individual packet*’s information and ‘multiple orthogonal classification attributes.’” *Id.* (citing Ex. 1008, Fig. 2A, 9:16–18, 9:20–25, 10:20–39). In contrast with claim 1, Patent Owner contends, “Riddle does not analyze a packet based on the context provided by previously encountered packets.” *Id.* Because “Riddle’s evaluation turns based on the ‘information’ and ‘attributes’ in an *individual packet*, as opposed to relying on the context and relationship of various packets with one another,” Patent Owner argues, “Riddle has no concept of ‘state of the flow.’” *Id.* at 55. Finally, citing the Board’s findings in related proceedings that Riddle does not teach state transition patterns or “the state of [a] conversational flow of [a] packet being indicative of the sequence of any previously encountered packets of the same conversational flow,” Patent Owner further contends that the Board already rejected arguments mirroring those raised by Petitioner in this proceeding with respect to this limitation. *Id.* at 55–57 (citing IPR2020-00335, Paper 19 at 19–20 (PTAB Aug. 27, 2020); IPR2020-00336, Paper 21 at 48–49 (PTAB Sept. 10, 2020)).

In its Reply, Petitioner points out that, in contrast to the limitations at issue in the related proceedings cited by Patent Owner, claim 1 of the ’646 patent recites “a conversational flow being an exchange of ***one*** or more packets in any direction between two network entities . . . the state processor being to perform any state operations . . . in the case that ***the packet*** is from an existing flow, and to perform any state operations . . . in the case that ***the packet*** is from an existing flow.” Reply 15 (alterations in original).

Petitioner contends that the limitations of claim 1 thus “refer to the [’646] patent’s embodiments whereby information from an individual packet is sufficient for the state-based analysis of a conversational flow” and “[n]one

of these limitations requires state transitions to occur across a sequence of packets.” *Id.* Furthermore, Petitioner argues, even if the state-related limitations required analyzing more than one packet, Riddle would meet them by its disclosure of classifying service aggregates based on a plurality of indicators across multiple packets. *Id.* at 15–17 (citing, e.g., Ex. 1008, 11:11–20, 12:42–63, 13:40–59, Fig. 4B, claim 5; Ex. 1006 ¶¶ 120, 121, 132, 353, 356, 357, 360, 361, 366–369, 628, 632–634, 665, 666).

Patent Owner contends in its Sur-reply that Petitioner has omitted critical claim language by using ellipses to present an abbreviated version of the recited claim limitation. Sur-reply 19. According to Patent Owner, Petitioner thereby provides an improper invalidity analysis by dropping several requirements of the claim language. *Id.* For example, Patent Owner contends, “claim 1 requires the presence of a state processor that can perform certain steps, which appears nowhere in Riddle,” and “Petitioner glosses over the requirement that a state processor be used.” *Id.* “Even under Petitioner’s interpretation of a conversational flow,” Patent Owner argues, “Riddle merely tallies occurrences of certain types of packets, and does not consider the sequence of any previously encountered packets of the same flow.” *Id.* at 19–20. According to Patent Owner, “[n]othing Petitioner cites in Riddle suggests deviating from its serial analysis, nor does Petitioner argue that the processing of a packet in Riddle depends on earlier packets.” *Id.* at 20.

(2) Analysis

Having considered the parties’ respective contentions, we find that Petitioner’s assertions are supported by the cited evidence and are persuasive that the combination of Riddle and Ferdinand teaches this limitation for the reasons presented by Petitioner, which we adopt. We agree with Petitioner

that the disputed limitation differs substantially from the limitations that were at issue in the related proceedings cited by Patent Owner and that the differences are significant with respect to our analysis. Notably, the Board did not find in either of those related proceedings that Riddle fails to disclose a “state processor . . . to perform any state operations specified for . . . an existing flow, and to perform any state operations required for the initial state of [a] new flow,” as recited in independent claim 1 of the ’646 patent. Instead, the Board found, for example, that Petitioner had not sufficiently shown that the asserted prior art teaches or suggests “state *transition* patterns” across multiple packets (IPR2020-00335, Paper 19 at 14–22 (emphasis added)). That limitation does not appear in claim 1 of the ’646 patent. Moreover, we agree with Petitioner that information only from an individual packet is required for the state-based analysis recited in claim 1 and that the claim does not require state transitions to occur across a sequence of packets. *See* Reply 15. In particular, as Petitioner explains, claim 1 here recites “a conversational flow being an exchange of ***one*** or more packets.” Ex. 1003, 36:48–51 (emphasis added). And thus information only from an individual packet is required (i.e., “one” packet is covered). In contrast, the corresponding limitation that was at issue in the related proceedings recited “a sequence of *packets*” or a “conversational flow of *packets*” (i.e., packets in plural form). *See* Ex. 1001, 35:34–35 (reciting limitation in claim 1 of the ’099 patent).

Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that the recited limitation is taught by the combination of Riddle and Ferdinand.

i. Remaining Limitations of Claims 7 and 16

Supported by the testimony of Dr. Weissman, Petitioner contends, and we agree, that Riddle discloses each of the remaining limitations of claims 7 and 16. Pet. 66–72 (citing Ex. 1006 ¶¶ 343, 668–671, 692–700, 705–706, 715–734; Ex. 1008, code (57), 4:10–15, 5:53–57, 8:47–9:27, 9:48–49, 9:64–65, 12:26–60, 13:36–62, 15:16–27, 15:56–16:30 (claims 1–3), 16:54–17:15 (claim 8), Figs, 3, 4A, 4B), 79. Patent Owner does not dispute Petitioner’s contentions regarding these limitations. *See generally* PO Resp.

Petitioner’s assertions are supported by the cited evidence and are persuasive. Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that each of the recited limitations is taught by Riddle and adopt the contentions set forth in the Petition and in Dr. Weissman’s Declaration as mapped to these undisputed limitations of claims 7 and 16 as our own findings. *NuVasive*, 841 F.3d at 974.

2. Dependent Claim 2

Claim 2 of the ’646 patent depends from claim 1 and further recites, “a parser subsystem coupled to the packet acquisition device and to the lookup engine such that the acquisition device is coupled to the lookup engine via the parser subsystem, the parser subsystem configured to extract identifying information from a received packet,” “wherein each flow-entry is identified by identifying information stored in the flow-entry, and wherein the cache lookup uses a function of the extracted identifying information.” Ex. 1003, 37:1–10.

Supported by the testimony of Dr. Weissman, Petitioner contends, and we agree, that Riddle in view of Ferdinand or Wakeman renders obvious each of the further limitations of claim 2 and that Riddle in view of Ferdinand and Wakeman renders obvious the further limitation of claim 3.

Pet. 72–75 (citing Ex. 1006 ¶¶ 294–327, 627–653, 672–680, 692–704; Ex. 1008, 4:10–15, 6:1–15, 12:26–59, 16:54–17:15 (claim 8), Figs. 1A, 4A). More particularly, according to Petitioner, the “parser subsystem coupled . . . to the lookup engine” clause of claim 2 would have been obvious over Riddle and Ferdinand for similar reasons to those presented for the similar limitations of claim 7 discussed in Sections III.E.1.d and III.E.1.g above. *See id.* at 72–73 (citing *id.* at 38–42, 59–61). With regard to the two “wherein” clauses recited in claim 2, Petitioner points to Step 408 of Riddle’s Figure 4A (i.e., “enter into a saved list characteristics of the traffic”) and the discussion of the “cache subsystem” limitation of claim 1 (*see supra* § III.E.1.f) and contends that a person of ordinary skill in the art “would have understood that Riddle’s lookup engine modified with the cache subsystem as taught by Ferdinand and/or Wakeman results in the cache lookup using a function of the extracted identifying information.” *Id.* at 74–75 (citing Ex. 1006 ¶¶ 637–653, 677–680; Ex. 1008, 12:42–53, Fig. 4A).

Patent Owner does not dispute Petitioner’s contentions regarding the limitations recited in claim 2. *See generally* PO Resp.

Petitioner’s assertions are supported by the cited evidence and are persuasive. We are persuaded that Petitioner has shown by a preponderance of the evidence that these undisputed limitations are taught by the asserted prior art and adopt the contentions set forth in the Petition and in Dr. Weissman’s Declaration as mapped to these limitations as our own findings. *NuVasive*, 841 F.3d at 974.

3. *Dependent Claim 3*

Claim 3 of the ’646 patent depends from claim 2 and further recites, “wherein the cache subsystem is an associative cache subsystem including

one or more content addressable memory cells (CAMs).” Ex. 1003, 37:11–13. Petitioner contends that Riddle in view of Ferdinand and Wakeman renders obvious the recited limitation. Pet. 75–76 (citing Ex. 1006 ¶¶ 185–191, 637–648, 681–685, 692–704; Ex. 1003, 19:56–20:2). More particular, Petitioner contends, “[c]onsistent with the ’646 Patent’s cache design paradigm that includes CAMs, a [person of ordinary skill in the art] would have understood that an associative cache was a well-known cache design paradigm”; that Wakeman teaches a CAM cache and it would have been obvious to modify Riddle’s flow-entry with a cache subsystem as taught, for example, by Wakeman; and that a person of ordinary skill in the art would have understood that Wakeman’s CAM cache is fully associative. *Id.* (citing Ex. 1006 ¶¶ 185–191, 637–648, 681–685). Relying on Dr. Weissman’s testimony, Petitioner further contends that “[b]efore the ’646 Patent, an associative cache was readily known to a [person of ordinary skill in the art] and using an associative cache was a routine engineering design choice.” *Id.* at 76 (citing Ex. 1006 ¶¶ 683–685).

Patent Owner contends that the asserted prior art fails to teach or suggest the associative cache subsystem recited in claim 3. PO Resp. 57–59. In particular, Patent Owner argues:

Petitioners argue that the use of an associative cache subsystem in ’646 Claim 3 is obvious, because: “a [person of ordinary skill in the art] would have understood that an associative cache was a well-known cache design paradigm in which a memory block can appear in any cache line and that the cache line is a form of a content addressable memory.” Petition at 75–76. Petitioners provide no support for this beyond a citation to Dr. Weissman, and Dr. Weissman provides only a conclusion that “Wakeman’s CAM cache can be a fully associative cache,” despite Wakeman not identifying what kind of cache it uses. Petitioners further argue “a [person of ordinary

skill in the art] would have understood that Wakeman's CAM cache is fully associative due to Wakeman not disclosing a cache placement policy indicating there are no constraints on placement within Wakeman's cache." *Id.* Dr. Weissman does not explain why the *absence* of a discussion of a cache placement policy in Wakeman would lead a [person of ordinary skill in the art] to just assume that Wakeman was teaching using of an associative cache placement policy.

First, Dr. Weissman did not provide any facts or analysis underlying his opinion, and therefore his analysis is entitled to little weight. 37 CFR § 42.65(a). His conclusory statement that Wakeman could be modified to utilize an associative cache does not demonstrate that a [person of ordinary skill in the art] would have been motivated to implement Wakeman's cache as a fully associative cache. "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990) (quoting *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984)) (emphasis added).

Second, even if an associative cache were a "common type of cache" as Dr. Weissman claims, its mere existence does not mean its use with the specific combination of elements claimed in '646 Patent Claim 3 would have been obvious. Ex. 1006 ¶ 683; Ex. 2061 ¶¶ 88–90. Associative caches are more expensive than direct mapping caches due to the requirement that every potential cache location must be searched in parallel when checking whether a value is already in the cache. Ex. 2061 ¶ 89. Wakeman asserts that "[c]hoosing an appropriate network switch [] requires a balancing between cost and performance"—it does not espouse the use of an associative caching policy over any other policy, and in light of Wakeman's emphasis on balancing cost, a [person of ordinary skill in the art] would not simply assume Wakeman to be teaching the use of the more expensive associative cache (as Dr. Weissman appears to argue). EX1014 (Wakeman) at 2:1–2; Ex. 2061 ¶ 90. If the use of an associative cache was truly as "common" in the field as Petitioners assert, then Petitioners would have offered a reference or at least some form of evidence demonstrating that its use was common in the field, or that a [person of ordinary skill in the art] would have assumed the use of an associative cache in the absence of any

discussion on cache placement policy. They did not, and for at least these reasons Petitioners have not shown claim 3 to be invalid.

PO Resp. 57–59.

In its Reply, Petitioner responds that Patent Owner and Ms. Quigley “concede [that] an associative cache was a known cache design that predates the challenged claims” and “don’t dispute that the prosecution history illustrates that using an associative cache was readily understood in the art to expedite memory accesses to and from processors.” Reply 27 (citing PO Resp. 58; Ex. 2061 ¶ 88). Petitioner further contends that “Dr. Weissman and the Petition refer to the prosecution history in which the Examiner discussed how associative caches were known in the art,” and “Dr. Weissman explains it would have been obvious to use associative caches because they expedite memory access for databases, particularly when storing Ethernet packet addresses, as taught in Riddle and Ferdinand.” *Id.* at 27–28 (citing Ex. 1006 ¶¶ 643–648, 683, 684; Ex. 1019, 193–201 (’646 patent’s prosecution history); Pet. 58–59, 75–76). Still further, Petitioner argues that Ms. Quigley’s testimony on which Patent Owner bases its lack-of-motivation argument “is bereft of any evidentiary support and is conclusory,” and therefore, is entitled to little weight. *Id.* at 28 (citing Ex. 2061 ¶ 89; PO Resp. 58; 37 CFR § 42.65(a)). According to Petitioner, the fact that other cache types existed does not lessen the obviousness of using an associative cache in Riddle’s system, and Ms. Quigley’s testimony that Wakeman teaches away from using an associative cache “overlooks un rebutted testimony from Dr. Weissman that ‘[associative] caches were well-known to reduce look-up times’ and thus would have improved the performance of Riddle’s system.” *Id.* at 28–29 (alteration in original) (citing

In re Mouttet, 686 F.3d 1322, 1334 (Fed. Cir. 2012); Pet. 75–76; Ex. 1006 ¶ 684).

Having reviewed the full trial record, we conclude that Petitioner has not established by a preponderance of the evidence that claim 3 is unpatentable over the combination of Riddle, Ferdinand, and Wakeman. We agree with Patent Owner that Petitioner provides insufficient evidence to support its contentions. Indeed, the Petition’s discussion with respect to claim 3 does not even cite Wakeman, but instead cites only the testimony of Dr. Weissman and the specification of the ’646 patent. *See* Pet. 75–76.¹² And neither Dr. Weissman’s testimony nor the ’646 patent provides any persuasive support for Petitioner’s assertion that “a [person of ordinary skill in the art] would have understood that Wakeman’s CAM cache is fully associative due to Wakeman not disclosing a cache placement policy indicating there are no constraints on placement within Wakeman’s cache.” We agree with Patent Owner that “Dr. Weissman does not explain why the *absence* of a discussion of a cache placement policy in Wakeman would lead a [person of ordinary skill in the art] to just assume that Wakeman was teaching using of an associative cache placement policy,” and that his testimony in this regard is entitled to little, if any, weight. PO Resp. 58; 37 CFR § 42.65(a). As Patent Owner contends, Dr. Weissman’s statement that Wakeman could be modified to utilize an associative cache does not

¹² To be sure, the discussion of claim 3 in the Petition also includes an internal cross-reference to the “discuss[ion] regarding element 1.3,” i.e., the “cache subsystem” limitation of claim 1, discussed at Pet. 57–59. Although the discussion of that limitation does include citations to Wakeman (*see* Pet. 58 (citing Ex. 1014, 1:20–28, 1:55–67, 2:31–49, 3:36–45, 4:31–40, 5:22–27, Figs. 2, 3)), however, notably absent from that discussion is any assertion that Wakeman specifically suggests an associative cache.

demonstrate that a person of ordinary skill in the art would have been motivated to implement Wakeman's cache as a fully associative cache. *Id.* (citing *In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990)). Although we agree with Petitioner that there is no indication that Wakeman disparages the use of an associative cache (Reply 28–29), there still needs to be “some rational underpinning to support the legal conclusion of obviousness” (*KSR*, 550 U.S. at 418), and we do not find such underpinning on the record before us. Accordingly, we determine that Petitioner has not shown by a preponderance of the evidence that claim 3 is unpatentable over Riddle in view of Ferdinand and further in view of Wakeman.

4. *Dependent Claim 18*

Claim 18 of the '646 patent depends from claim 16 and further recites, wherein the function of the selected portions of the packet forms a signature that includes the selected packet portions and that can identify future packets, wherein the lookup operation uses the signature and wherein the identifying information stored in the new or updated flow-entry is a signature for identifying future packets.

Ex. 1003, 40:8–14. Petitioner contends, and we agree, that these limitations are taught by Riddle, asserting that Riddle discloses “pars[ing] packet portions to identify a signature (i.e., identifying information) and stor[ing] the signature extracted from [the] parsed packet portion[s] for identifying future packets,” as well as “using identifying information that includes selected portions of the packet to identify future packets to suppress duplicates of previously identified packet flows.” Pet. 79–80 (citing Ex. 1006 ¶¶ 746–750; Ex. 1008, 12:42–59, Fig. 4A). Patent Owner does not dispute Petitioner's contentions regarding these limitations. *See generally* PO Resp.

Petitioner's assertions are supported by the cited evidence and are persuasive. We are persuaded that Petitioner has shown by a preponderance of the evidence that these undisputed limitations are taught by the asserted prior art and adopt the contentions set forth in the Petition and in Dr. Weissman's Declaration as mapped to these limitations as our own findings. *NuVasive*, 841 F.3d at 974.

5. Conclusion Regarding Ground 1

For the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1, 2, 7, 16, and 18 is unpatentable for obviousness over Riddle in view of Ferdinand and Wakeman. As to claim 3, however, we find that Petitioner has not provided sufficient and persuasive evidence and reasoning that the combination of Riddle, Ferdinand, and Wakeman teaches or suggests the associative cache limitation, and we, therefore, conclude that Petitioner has not shown that the subject matter of claim 3 would have been obvious on this ground.

F. Obviousness over Riddle, Ferdinand, Wakeman, and Yu, or over Riddle, Ferdinand, Wakeman, and RFC1945

Petitioner contends that claims 1–3, 7, 16, and 18 also would have been obvious over the combination of Riddle, Ferdinand, and Wakeman, in further view of Yu or RFC1945. *See* Pet. 80–87 (Riddle in view of Ferdinand, Wakeman, and Yu); *id.* at 87–95 (Riddle in view of Ferdinand, Wakeman, and RFC1945). Having determined that Petitioner establishes by a preponderance of the evidence that the subject matter of claims 1, 2, 7, 16, and 18 would have been obvious over the combination of Riddle, Ferdinand, and Wakeman, we need not address Petitioner's additional grounds challenging these claims. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner "is entitled to a final written decision

addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (“We agree that the Board need not address [alternative grounds] that are not necessary to the resolution of the proceeding.”).

Further, with respect to claim 3, which we conclude that Petitioner did not show to be unpatentable over the combination of Riddle, Ferdinand, and Wakeman (*see supra* § III.E.3), Petitioner has not alleged that Yu or RFC1945 teaches or suggests the recited associative cache subsystem. *See generally* Pet.; Reply. Accordingly, we likewise conclude that Petitioner has not shown claim 3 to be unpatentable by a preponderance of the evidence over the combinations of Riddle, Ferdinand, and Wakeman with either Yu or RFC1945.

IV. CONCLUSION¹³

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties’ respective arguments, Petitioner has shown by a preponderance of the evidence that each of claims 1, 2, 7, 16, and 18 of the ’646 patent is unpatentable, but Petitioner has not shown that claim 3 is unpatentable.

¹³ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

Accordingly, it is

ORDERED that claims 1, 2, 7, 16, and 18 of U.S. Patent No. 6,771,646 B1 are held unpatentable under 35 U.S.C. § 103 as obvious;

FURTHER ORDERED that claim 3 of U.S. Patent No. 6,771,646 B1 is not held unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–3, 7, 16, 18	103(a)	Riddle, Ferdinand, Wakeman	1, 2, 7, 16, 18	3
1–3, 7, 16, 18	103(a)	Riddle, Ferdinand, Wakeman, Yu ¹⁴		3
1–3, 7, 16, 18	103(a)	Riddle, Ferdinand, Wakeman, RFC1945 ¹⁵		3
Overall Outcome			1, 2, 7, 16, 18	3

¹⁴ As explained above, we do not reach this ground except with respect to claim 3. *See supra* § III.F.

¹⁵ As explained above, we do not reach this ground except with respect to claim 3. *See supra* § III.F.

IPR2020-00337
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