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Paper 35
Date: November 9, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

LONGHORN HD LLC,
Patent Owner.

IPR2020-00879
Patent 7,260,846 B2

Before KARL D. EASTHOM, GARTH D. BAER, and MATTHEW S. MEYERS, *Administrative Patent Judges*.

MEYERS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Dismissing Petitioner's Motion to Exclude
37 C.F.R. § 42.64

I. INTRODUCTION

A. Background and Summary

Unified Patents, LLC, ("Petitioner") filed a Petition (Paper 1, "Petition" or "Pet.") requesting *inter partes* review of claims 7, 8, 10, and 11 of U.S. Patent No. 7,260,846 B2 (Ex. 1001, "the '846 patent"). Longhorn HD LLC, ("Patent Owner") filed a Preliminary Response. Paper 8. We instituted an *inter partes* review on claims 7, 8, 10, and 11 on all grounds asserted in the Petition. *See* Paper 10 ("Decision on Institution" or "Dec. on Inst."). After institution of trial, Patent Owner filed a Patent Owner Response (Paper 15, "PO Resp."), Petitioner filed a Reply (Paper 18, "Pet. Reply"), and Patent Owner filed a Sur-Reply (Paper 20, "Sur-Reply").

After filing an objection to Patent Owner's evidence (Paper 16), Petitioner filed a motion to exclude certain testimony from the declaration of Mr. Jawadi. Paper 24 ("Mot."). Patent Owner filed an opposition (Paper 25, "Opp."), and Petitioner filed a reply (Paper 26, "Reply"). We held a hearing on August 25, 2021, a transcript of which is included in the record. *See* Paper 33 ("Tr.").

We have authority under 35 U.S.C. § 6. Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 7, 8, 10, and 11 of the '846 patent are unpatentable.

B. Real Parties in Interest

Unified Patents indicates that it alone is the real party-in-interest, and that "no other party exercised control or could have exercised control over Unified's participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial." Pet. 1. Patent Owner indicates that it alone is the real party-in-interest. Paper 4, 2.

C. Related Matters

Petitioner identifies the following district court proceedings as related to the '846 patent: *Longhorn HD LLC. v. Fortinet Inc.*, 2:19-cv-00124 (E.D. Tex. April 16, 2019); *Longhorn HD LLC. v. Juniper Networks, Inc.*, 2:19-cv-00385 (E.D. Tex. Nov. 20, 2019); and *Longhorn HD LLC. v. Check Point Software Technologies Ltd.*, No. 2:19-cv-00384 (E.D. Tex. Nov. 11, 2019). Pet. 2.

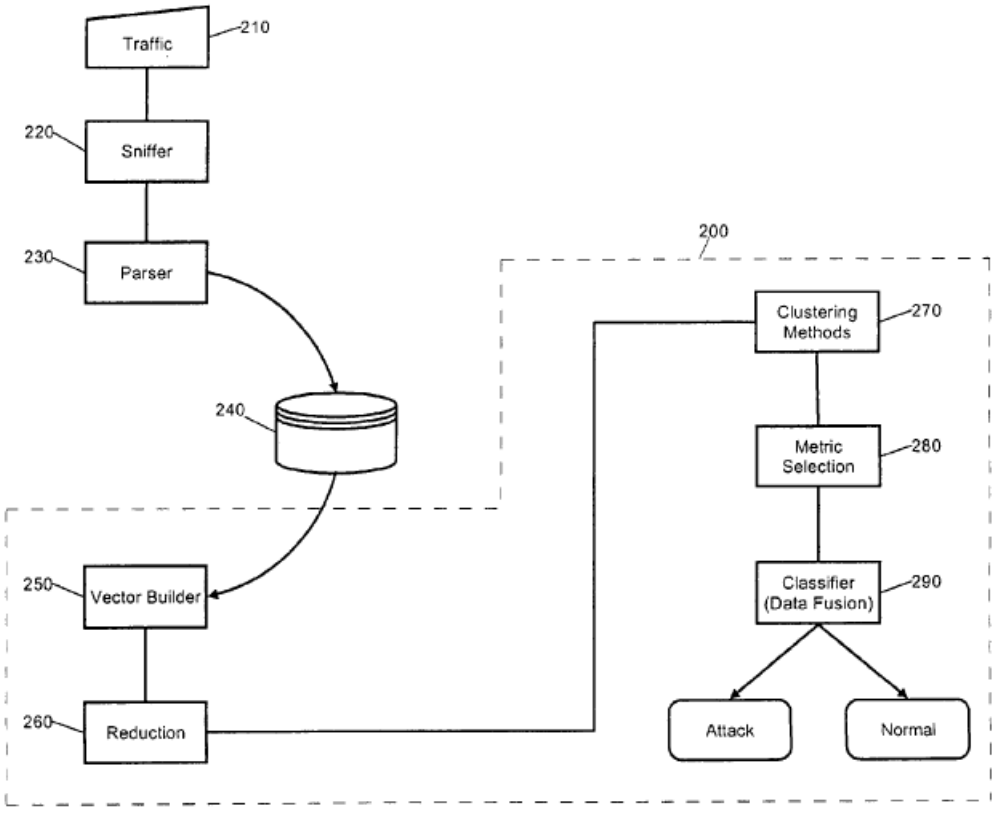
II. BACKGROUND

A. The '846 Patent

The '846 patent is titled "INTRUSION DETECTION SYSTEM." Ex. 1001, code (54). According to the '846 patent, "[t]o fill the security gap left open by firewall usage, information technologists incorporate intrusion detection system (IDS) technology within the enterprise." *Id.* at 1:44–46. The '846 patent is directed to an IDS that "can monitor [any] packets passing across a coupled communications path" and "identify protocol boundaries separating the various fields of each passing network packet and can store data for selected ones or all of the fields in a database, such as a relational database." *Id.* at 4:25–31. "In particular, data for each field can be stored in a separate record to facilitate the robust analysis of the stored data at a substantially granular level." *Id.* at 4:31–33.

The ’846 patent explains that “[o]nce sufficient data has be[en] stored in the database, multidimensional vectors can be constructed and reduced from the stored data” and “[t]he reduced multi-dimensional vectors can be processed using one or more conventional multi-variate analysis methods and the output sets produced by the multi-variate analysis methods can be correlated against one another according to one or more selected metrics.” Ex. 1001, 4:34–40. Then, “[b]ased upon these correlations, both normal and anomalous events can be identified.” *Id.* at 4:40–42.

Figure 2 of the ’846 patent, reproduced below, is a flow chart illustrating a process for performing intrusion detection. Ex. 1001, 8:6–7.



As shown in Figure 2 (above), packet sniffer 220 can extract network traffic 210 flowing across a communications path coupled to IDS 200. *Id.* at 8:7–10. Parser 230 can de-construct the network packets along known protocol field boundaries, such as destination and source IP address, time-to-live,

payload size, packet type, type of service, etc. *Id.* at 8:28–31. Subsequently, selected ones of the de-constructed fields can be stored in separate records in database 240 and can be associated with the particular socket to which the packet belongs. *Id.* at 8:32–35.

In block 250, a vector builder in a feature extraction process can select individual ones of the network packet fields to be included in the construction of a multi-dimensional vector. Ex. 1001, 8:39–42. Multi-dimensional vectors can be constructed using the chosen features produced in block 250. *Id.* at 8:51–53. Specifically, the vector builder can process the records in the database 240 to identify pertinent fields associated with a particular "conversation" or socket. *Id.* at 8:53–55. In block 260, a vector separation system can reduce the dimensionality of the multi-dimensional vectors in order to simplify a subsequent multi-variate analysis. *Id.* at 8:64–66. Components of the multi-dimensional vectors that appear to be redundant, irrelevant, or otherwise insignificant relative to other interested components can be eliminated across all or a selection of the multi-dimensional vectors to produce a set of reduced vectors. *Id.* at 8:66–9:7.

In block 270, one or more self-organizing clustering methodologies can be applied concurrently or sequentially to the set of reduced vectors. Ex. 1001, 9:8–10. After the reduced vectors have been processed by the multiple clustering methodologies in block 270, one or more metrics can be selected in block 280 for purposes of establishing a correlation between the output sets of the processed reduced multi-dimensional vectors. *Id.* at 9:15–19. In block 290 a classifier can identify from any established correlations whether an anomaly has been detected. *Id.* at 9:21–23. The classification process of block 290 can identify either normal traffic or an attack. *Id.* at 9:25–26.

B. Illustrative Claims

The '846 patent includes twelve claims, and Petitioner challenges claims 7, 8, 10, and 11. Claim 7, the sole challenged independent claim, is illustrative and reads as follows:

> 1. An intrusion detection method comprising the steps of:
>
> monitoring network traffic passing across a network communications path:
>
> extracting network packets from said passing traffic;
>
> storing individual components of said network packets in a database;
>
> constructing multi-dimensional vectors from at least two of said stored individual components and applying at least one multi-variate analysis to said constructed multi-dimensional vectors, said at least one multi-variate analysis producing a corresponding output set;
>
> establishing a correlation between individual output sets based upon a selected metric to identify anomalous behavior; and
>
> classifying said anomalous behavior as an event selected from the group consisting of a network fault, a change in network performance and a network attack.

Ex. 1001, 11:29–45.

C. Asserted Grounds of Unpatentability

Pursuant to 35 U.S.C. § 314(a), on November 11, 2020, we instituted *inter partes* review on all grounds asserted in the Petition, namely:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
7, 8	103(a)[1]	Portnoy,[2] Cannady,[3] Barbara[4]
10, 11	103(a)	Portnoy, Cannady, Barbara, AAPA

See Pet. 4, 5, 29–70. Petitioner also relies on the declaration of Jaideep Srivastava, Ph.D. Ex. 1002 ("Srivastava Decl."). Patent Owner relies on testimony from Zaydoon Jawadi. Ex. 2001 ("Jawadi Decl.").[5] Patent Owner cross-examined Dr. Srivastava. *See* Ex. 2003 (deposition transcript of Dr. Jaideep Srivastava, "Srivastava Dep.").

III. ANALYSIS

A. Principles of Law

To prevail in its challenges to Patent Owner's claims, Petitioner must demonstrate by a preponderance of the evidence that the challenged claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2019). A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between

[1] The relevant sections of the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, took effect on March 16, 2013. Because the application that issued as the '351 patent was filed before March 16, 2013, we apply the pre-AIA version of § 103.
[2] Eskin et al., US 9,306,966 B2, issued Apr. 5, 2016 (Ex. 1004). Petitioner and Patent Owner both refer to this reference as "Portnoy." Accordingly, this Decision also refers to Exhibit 1004 as Portnoy.
[3] Cannady, J., "*Artificial Neural Networks for Misuse Detection,*" Nova Southeastern University School of Computer and Information Sciences (Ex. 1012). *See* Pet. 16 ("Cannady was publicly accessible by December 10, 1998 and May 20, 1999 at the Cornell University Library.").
[4] Barbara, D., "*Detecting Novel Network Intrusions Using Bayes Estimators,*" First SIAM International Conference on Data Mining conference (April 2001) (Ex. 1013).
[5] We note that many of Patent Owner's citations to Mr. Jawadi's declaration refer to the wrong paragraph. We understand this to be typographical error, and our analysis refers to the intended paragraph when providing citation.

the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of non-obviousness.[6] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of invention. *Graham*, 383 U.S. at 17. Petitioner asserts that a person having ordinary skill in the art at the time of the invention ("POSITA") would have had "(i) a Bachelor of Science in Electrical and Computer Engineering, Mathematics, Computer Science, or the equivalent, and (ii) approximately two years of experience with network security and intrusion detection related fields." Pet. 28–29 (citing Ex. 1002 ¶ 45). Patent Owner does not dispute Petitioner's assessment or otherwise argue that that it would affect the merits of the case. *See generally* PO Resp.

We adopt the assessment offered by Petitioner as it is consistent with the '846 patent and the asserted prior art. The prior art of record in the instant proceeding reflects the appropriate level of ordinary skill in the art.

[6] Patent Owner presents no evidence of objective indicia in its papers. *See generally* PO Resp.; PO Sur-Reply.

Cf. Okajima v. Bourdeau, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (the prior art itself may reflect an appropriate level of skill in the art).

C. Claim Construction

In an *inter partes* review for a petition filed on or after November 13, 2018, "[claims] of a patent . . . shall be construed using the same claim construction standard that would be used to construe the [claims] in a civil action under 35 U.S.C. 282(b), including construing the [claims] in accordance with the ordinary and customary meaning of such [claims] as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *See* 37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1015, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

According to Petitioner, "a POSITA would apply the ordinary and customary meanings to all the claim elements in the challenged claims of the '846 patent," and as such, "no specific claim construction is necessary." Pet. 29. Patent Owner does not dispute Petitioner's assessment. *See generally* PO Resp; *see also* Ex. 2001 ¶ 30 ("Although I am not rendering an opinion regarding claim construction, my opinions and analysis apply to Petitioner's proposed meanings of the claim terms.").

We determine, as we did in the Institution Decision, that no explicit construction of claim terms is needed to resolve the issues presented by the arguments and evidence of record. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (per curiam)

(claim terms need to be construed "only to the extent necessary to resolve the controversy" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Alleged Obviousness over Portnoy, Cannady, and Barbara (Ground 1: Claims 7 and 8)

Petitioner contends that claims 7 and 8 are unpatentable as obvious over Portnoy, Cannady, and Barbara. Pet. 30–60. Petitioner also relies on the testimony of Dr. Srivastava to support its arguments. *Id.* Patent Owner disagrees with Petitioner's assertions. PO. Resp. 4–32; Sur-Reply 2–12. Patent Owner relies on the testimony of Mr. Jawadi to support its arguments. *Id.*

We begin our discussion with a brief summary of Portnoy, Cannady, and Barbara and then address the evidence and arguments presented.

1. Overview of Portnoy (Ex. 1004)

Portnoy "relates to systems and methods [for] detecting anomalies in the operation of a computer system, and more particularly to a method of unsupervised anomaly detection." Ex. 1004, 1:49–51. By way of background, Portnoy explains that the most widely deployed and commercially available methods for intrusion detection employ signature-based detection. *Id.* at 1:55–57. Signature-based detection methods extract features from various audit streams, and detect intrusions by comparing the feature values to a set of known attack signatures provided by human experts. *Id.* at 1:57–60. Signature-based detection methods can only detect previously known intrusions, the signature database has to be manually revised for each new type of attack that is discovered, and, until this revision, systems are vulnerable to these attacks. *Id.* at 1:60–64.

Portnoy explains that another approach to intrusion detection is supervised anomaly detection. Ex. 1004, 2:40–41. Some supervised anomaly detection systems may be considered to perform "generative modeling," which involves building a model over the normal data and then checking to see how well new data fits into that model. *Id.* at 2:42–45. A limitation of supervised anomaly detection algorithms, however, is that they require a set of purely normal data from which they train their model, but labeled or purely normal data may not be readily available, or may be prohibitively expensive. *Id.* at 3:6–16.

Portnoy further describes "a third paradigm of intrusion detection algorithms" that is known as "unsupervised anomaly detection." Ex. 1004, 3:28–29. According to Portnoy, unsupervised anomaly detection has many advantages over supervised anomaly detection systems. *Id.* at 3:50–51. One advantage is that unsupervised anomaly detection does not require a purely normal training set. *Id.* at 3:51–52. Unsupervised anomaly detection algorithms can be performed over unlabeled data, which is typically easier to obtain because it is simply raw audit data collected from a system. *Id.* at 3:53–56. Portnoy describes "a system and methods for detecting an intrusion in the operation of a computer system comprising receiving a set of data corresponding to a computer operation and having a set or vector of features." *Id.* at 4:52–55. And because the method is an unsupervised anomaly detection method, the set of data to be analyzed need not be labeled to indicate an occurrence of an intrusion or an anomaly. *Id.* at 4:55–58. The method implicitly maps the set of data instances to a feature space, and determines a sparse region in the feature space. *Id.* at 4:58–60. A data instance is designated as an anomaly if it lies in the sparse region of the feature space. *Id.* at 4:60–61.

2. Whether Portnoy Qualifies as Prior Art

The parties dispute whether Portnoy (also referred to as the Portnoy patent) qualifies as prior art to the '846 patent.[7] Petitioner asserts that Portnoy qualifies as prior art under (pre-AIA) 35 U.S.C. § 102(e) because it is entitled to the priority dates of its provisional applications, which were filed on December 14, 2001,[8] and January 29, 2002,[9] respectively. Pet. 3, 9–15; Pet. Reply 1–16. Patent Owner disagrees and argues that Petitioner failed to meet its burden to properly establish that Portnoy is entitled to the earlier priority date of its provisional applications under the standard set forth by the Federal Circuit in *Dynamic Drinkware*. PO Resp. 13 (citing *Dynamic Drinkware*, 800 F.3d at 1378–80); *see also id.* at 13–22.

The Federal Circuit in *Dynamic Drinkware* began with the requirement that a patent must satisfy 35 U.S.C. § 119(e)(1) to gain the benefit of a provisional application filing date. *Dynamic Drinkware*, 800 F.3d at 1378. According to the Federal Circuit, this requirement includes that "the specification of the provisional must 'contain a written description of the invention . . . in such full, clear, concise, and exact terms,' . . . to enable an ordinarily skilled artisan to practice the invention claimed in the non-provisional application." *New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co.*, 298 F.3d 1290, 1294 (Fed. Cir. 2002) (quoting 35 U.S.C. § 112, first

[7] For prior art purposes, "Petitioner assumes a priority date [of] July 30, 2002" for the '846 patent. Pet. 6, fn. 3. Patent Owner agrees with this assessment. *See* PO Resp. 1–2 ("[T]he earliest filing date of the '846 Patent . . . [is] July 30, 2002.").
[8] U.S. Provisional Patent Application No. 60/340,196, filed Dec. 14, 2001 (Ex. 1005) ("Portnoy '196 Provisional").
[9] U.S. Provisional Patent Application No. 60/352,894, filed Jan. 29, 2002 (Ex. 1007) ("Portnoy '894 Provisional").

paragraph) (*quoted in Dynamic Drinkware*, 800 F.3d at 1378) (emphasis omitted).

Of particular note is the focus on "the *invention* claimed" in the non-provisional application (later issued as the reference patent). *New Railhead*, 298 F.3d at 1294 (emphasis added and omitted). This is consistent with prior Federal-Circuit precedent explaining that the rationale behind § 102(e) is that a patent should be "treated as prior art as of its filing date because at the time the application was filed in the Patent Office the inventor was presumed to have disclosed an invention which, but for the delays inherent in prosecution, would have been disclosed to the public on the filing date." *In re Wertheim*, 646 F.2d 527, 536 (CCPA 1981); *see also id.* at 532 (discussing *Alexander Milburn Co. v. Davis-Bournonville Co.*, 270 U.S. 390 (1926), and that § 102(e) is "a codification of the rule of" the *Milburn* case).

Therefore, under the reasoning of these cases, a patent may be considered prior art as of the date of a provisional application so long as the provisional disclosed (sufficiently under § 112) the same invention eventually claimed in the patent. As a result, if the patent is shown to have at least one claim to an invention that is supported by the disclosure of a provisional application, it can be said that the provisional disclosed the same invention eventually claimed in the patent, and the patent may be considered prior art as of the filing date of the provisional under § 102(e)(2).

Here, Petitioner asserts that the Portnoy patent is entitled to a priority date "as of January 29, 2002 (the filing date of the later filed '894 Provisional Application)." Pet. 10; *see also id.* at 9 ("Portnoy is [p]rior [a]rt [a]t [l]east [a]s [o]f January 29, 2002." (emphasis omitted)). According to Petitioner, "both the [Portnoy] '894 Provisional and the [Portnoy] '196 Provisional supports claim 1 of Portnoy." Pet. 15 (citing Ex. 1002 ¶ 95). To

support its position, Petitioner provides a claim chart identifying written description in *both* of the Portnoy Provisional Applications for every limitation in Claim 1 of the Portnoy patent (Ex. 1004). Pet. 11–14 (citing Exs. 1002, 1005, 1007); *see Dynamic Drinkware*, 800 F.3d at 1381–82. And in its analysis of the challenged claims of the '846 patent, Petitioner provides parallel citations to the Portnoy patent and the corresponding disclosures in Portnoy's provisional applications (*see generally* Pet. 30–70; *see also* Ex. 1002, 41–101) to demonstrate that the relevant disclosures of the Portnoy patent were carried over from the Portnoy Provisional Applications. *See In re Giacomini*, 612 F.3d 1380, 1383 (Fed. Cir. 2010) (holding that a claim is unpatentable "if another's patent discloses the same invention, which was carried forward from an earlier U.S. provisional application or U.S. non-provisional application").

In response, Patent Owner maintains that the Portnoy patent does not qualify as prior art "[b]ecause the Portnoy '196 Provisional Application and the Portnoy '894 Provisional Application both fail the disclosure requirement and claims requirement set forth by *Dynamic Drinkware*." PO Resp. 13. More particularly, Patent Owner argues that: (i) neither the Portnoy '196 Provisional Application nor the '894 Provisional Application provides sufficient § 112 support for a "computer system," as set forth in the preamble of claim 1 of the Portnoy patent (PO Resp. 14; Sur-Reply 10); (ii) claim 1 of the '966 Patent is directed to ineligible subject matter under 35 U.S.C § 101, and as such, it is not a claimed invention and cannot be relied on as prior art (PO Resp. 15–17; Sur-Reply 11); and (iii) "the disclosures of [the Portnoy patent] that Petitioner identifies as allegedly providing support for its obviousness analysis are not adequately supported

in the provisional applications" (PO Resp. 17–22; Sur-Reply 5–6). We address each argument in turn.

a. Whether the Portnoy Provisional Applications support a "computer system"

Patent Owner asserts that claim 1 of the Portnoy patent "requires a 'computer system,'" but neither the Portnoy '196 Provisional Application nor the '894 Provisional Application "represents a 'computer system' as described in the [S]pecification as well as the only independent claim (claim 1) of the Portnoy '966 Patent." PO Resp. 14; Sur-Reply 3–4. Patent Owner acknowledges that "the Portnoy '196 and '894 Provisionals may mention an 'intrusion detection system' (IDS)," but argues that neither provisional application "disclose[s] an IDS system." PO Resp. 14 (citing Ex. 1007, 1).

Having considered the arguments and evidence presented during trial, we determine that Petitioner persuasively shows that the Portnoy Provisional Applications provide adequate support for using a "computer system" as set forth in the preamble of claim 1 of the Portnoy patent. Ex. 1004, 29:27–28 (The preamble of claim 1 sets forth "[a] method for unsupervised detection of an anomaly in the operation of a computer system.").

To satisfy the written description requirement, the claimed subject matter need not be described "*in haec verba*" in the original disclosure. *See In re Wright*, 866 F.2d 422, 425 (Fed. Cir. 1989). Rather, the test for determining compliance with the written description requirement is whether the original disclosure of the patent application reasonably conveys to a person of ordinary skill in the art that the inventor had possession of the claimed subject matter as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

The Portnoy '894 Provisional[10] is titled "A Geometric Framework for Unsupervised Anomaly Detection: Detecting Intrusions in Unlabeled Data." Ex. 1007, 1. The '894 Provisional discloses, by way of introduction, that "[i]ntrusion detection systems (IDSs) are an integral part of any complete security package of a modern, well managed network system." *Id.* The Portnoy '894 Provisional describes "a new geometric framework for *unsupervised anomaly detection*, which are algorithms that are designed to process unlabeled data." *Id.* The Portnoy '894 Provisional presents a framework in which "data elements are mapped to a feature space" and discloses "three algorithms for detecting which points lie in sparse regions of the feature space." *Id.* The Portnoy '894 Provisional further describes evaluating its approach "by performing experiments over network records from the KDD CUP 1999 data set and system call traces from the 1999 Lincoln Labs DARPA evaluation." *Id.*

Patent Owner argues that "[t]he Portnoy Provisionals do not disclose a computer system within the scope of [c]laim 1 in part because the Portnoy Provisionals do not disclose a working IDS." Sur-Reply 3. According to Patent Owner,

> [a] POSITA would understand, at the very least, that an IDS system operates inside a computer system and contains the ability to extract and analyze data. Ex. 2001, ¶ 57. Although the algorithms disclosed may correspond to those that can be programmed into a computer, a working computer system would collect and store data in order to perform operations on that data to reach a conclusion. *Id.* These steps are not disclosed by the Portnoy '196 and '894 Provisionals.

[10] Petitioner asserts that the Portnoy patent is entitled to a priority date "as of January 29, 2002 (the filing date of the later filed '894 Provisional Application)." Pet. 10.

PO Resp. 14. However, we agree with Petitioner "that Portnoy's provisional applications need not disclose a specific type or design of a computer system." Pet. Reply 4. Instead, the Portnoy Provisional Applications need only reasonably convey to a person of ordinary skill in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.*; *Ariad*, 598 F.3d at 1351. And, to the extent Patent Owner asserts that the Portnoy Provisional Applications fail to convey adequately to one of ordinary skill in the art that the inventor had possession of the steps of "collect[ing] and stor[ing] data," Patent Owner's argument is unpersuasive, at least because claim 1 of the Portnoy patent does not recite such subject matter. *See* Ex. 1004, 29:27–28; *Cf.* Pet. 11–14; *see also Dynamic Drinkware*, 800 F.3d at 1382 ("A provisional application's effectiveness as prior art depends on its written description support for the claims of the issued patent of which it was a provisional.").

Patent Owner directs attention to the deposition testimony of Dr. Srivastava during cross examination. *Id.* at 3–4. According to Patent Owner,

> Petitioner's expert testified that the Portnoy Provisionals do not disclose an "operational system." ("Q: What do you mean by real world system? A: Operational system. One that is in this particular context one that is actually operationally deployed. Q: So, Portnoy des not expressly disclose an operation[al] system, right? A: At least not in exhibits 1005 and 1007 that we just discussed.").

Sur-Reply 3 (citing Ex. 2003, 148:13–21). Based on this testimony, and relying on its expert witness, Mr. Jawadi, Patent Owner concludes that "the Portnoy Provisionals do not disclose the required computer system." *Id.* at 4 (citing Ex. 2001 ¶¶ 45–47, 50, 57).

However, we do not understand the relied upon portion of Dr. Srivastava's deposition testimony to support Patent Owner's contention that the Portnoy Provisionals fail to provide adequate disclosure for the "computer system" in claim 1 of the Portnoy patent. In our opinion, Dr. Srivastava's testimony simply provides us with the understanding that the Intrusion Detection System (IDS), disclosed in conjunction with the "geometric framework for unsupervised anomaly detection," in the Portnoy Provisional Applications, was not "operationally deployed." Ex. 2003, 148:15–21. We find Dr. Srivastava's deposition testimony to be consistent with what Dr. Srivastava opined in his declaration testimony, i.e., "Portnoy is a proof of concept for a live system." Ex. 1002 ¶ 122; *see also id.* ¶ 128 ("Portnoy is a test of a live system relying on a prebuilt dataset.").

To the extent that Patent Owner relies upon the deposition testimony from Mr. Jawadi to contradict Dr. Srivastava's deposition testimony (Sur-Reply 4 (citing Ex. 2001 ¶¶ 45–47, 50, 57)), we find such reliance to be unpersuasive at least because Mr. Jawadi simply parrots Patent Owner's argument and provides little if any analysis in support. Instead, we credit, and give greater weight, to Dr. Srivastava's deposition testimony that one of ordinary skill in the art

> would have understood that the '894 Provisional Application discloses *[a] method for unsupervised detection of an anomaly in the operation of a computer system comprising*, as claim 1's preamble recites. The entirety of the '894 Provisional Application is directed to a geometric framework for unsupervised anomaly detection, which is *[a] method for unsupervised detection of an anomaly*. *See e.g.*, Ex. 1007 at p. 1 (Title) and (Abstract). Given that the paper explains its methodology in the context of intrusion detection systems, a POSITA in the art would have understood that the '894 Provisional Application is aimed at detecting anomalies in *the*

> *operation of a computer system*. Similarly, the '196 Provisional also "present[s] a new type of clustering-based intrusion detection algorithm, *unsupervised anomaly detection*." Ex. 1005 at p. 1 (Abstract) (emphasis in the original).

Ex. 1002 ¶ 90; *see also* Pet. Reply 2 (citing Ex. 1002 ¶ 90 ("[A] POSITA would have understood that the provisional applications disclose "detecting anomalies in *the operation of a computer system*.")). Thus, we determine that Petitioner has sufficiently shown that the Portnoy Provisional Applications provide adequate support for using a "computer system."

b. Whether claim 1 of the '966 Patent is directed to ineligible subject matter under 35 U.S.C § 101 rendering it unavailable as prior art?

Patent Owner asserts that the Portnoy patent cannot claim priority to the Portnoy Provisional Applications because "[c]laim 1 of Portnoy is directed to nothing more than an abstract idea, and is not patentable." PO Resp. 15–16. According to Patent Owner, "[t]he claims of the alleged reference must be directed to inventive subject matter in order to provide support for an analysis under *Dynamic Drinkware*." Sur-Reply 11.

In response, Petitioner argues that "there is no known precedent requiring consideration of patent subject matter eligibility for determining prior art eligibility." Pet. Reply 15. Petitioner explains

> 35 U.S.C. § 102(e) expressly applies to both "an application for patent" and "a patent granted on an application for patent." *See* 35 U.S.C. § 102(e). The statue's applicability to both patent applications and patents demonstrates that patent eligibility [is] immaterial to whether a reference can serve as prior art because patent applications often contain unexamined claims. Indeed, even abandoned applications may serve as prior art under 35 U.S.C. § 102(e) regardless of the reason for their abandonment, which may include failure to recite eligible subject matter. *See* MPEP [§] 901.02. Thus, there is no requirement that a claim

> recite patent eligible subject matter for a reference to qualify as prior art under 35 U.S.C. § 102(e).

Id. We agree with Petitioner.

The Federal Circuit has explained the conditions under which an issued patent is entitled to the filing date of a provisional application for prior art purposes, stating

> for a non-provisional application to claim priority to a provisional application for prior art purposes, "the specification of the provisional [application] must contain a written description of the invention . . . in such full, clear, concise, and exact terms, to enable an ordinarily skilled artisan to practice the invention claimed in the non-provisional application." Further, we have previously stated that "for the non-provisional utility application to be afforded the priority date of the provisional application . . . the written description of the provisional must adequately support the claims of the non-provisional application."

Amgen Inc. v. Sanofi, 872 F.3d 1367, 1380 (Fed. Cir. 2017) (quoting *Dynamic Drinkware*, 800 F.3d at 1378 and *New Railhead*, 298 F.3d at 1294, (alterations in original)). Thus, our reviewing court has determined that entitlement to a claim of priority is based on whether the written description of the provisional application adequately supports the claims. Here, Patent Owner identifies no authority, nor are we aware of any such authority, holding that the claims of an alleged prior art reference must be directed to patent-eligible subject matter for an analysis under *Dynamic Drinkware*. Sur-Reply 11. Accordingly, we agree with Petitioner that it may rely on the Portnoy patent as prior art under the circumstances presented.

> *c. Whether the portions of the Portnoy patent that Petitioner identifies as allegedly providing support for its obviousness analysis are adequately supported in the Portnoy Provisional Applications?*

Patent Owner asserts that the Portnoy Provisional Applications do not disclose the "monitoring," "extracting," and "storing" limitations recited by challenged claim 7. PO Resp. 17–22; Sur-Reply 5–6. And, "[b]ecause Petitioner has not shown 'the subject matter relied upon in the [Portnoy] patent is described in the provisional application[s]' the analysis fails the *Drinkware* test." PO Resp. 22. We disagree.

At the outset, we note that Petitioner relies on the Portnoy Provisional Applications in an obviousness challenge. We address whether the Portnoy Provisional Applications teach or disclose certain limitations of challenged claim 7, such as "monitoring," "extracting," and "storing," further below. However, in order to determine if Petitioner meets its burden of showing that the Portnoy patent properly claims priority to the Portnoy Provisional Applications under *Dynamic Drinkware*, the proper comparison is between the claims of the Portnoy patent (not the claims of the '846 patent) and the Portnoy Provisional Applications. Pet. Reply 5–6. As discussed above, Petitioner provides a claim chart identifying written description in *both* of the Portnoy provisional applications for every limitation in claim 1 of the Portnoy patent. Pet. 11–14.

Accordingly, we are persuaded that Petitioner has met its burden of showing, by a preponderance of the evidence, that the Portnoy patent properly claims priority to the Portnoy '196 Provisional Application and the Portnoy '894 Provisional Application. Therefore, we determine that the Portnoy patent is available as a prior art reference with an effective date of the filing date of at least the later filed Portnoy '894 Provisional Application for subject matter carried over to the Portnoy patent from the Portnoy Provisional Applications.

d. Conclusion

Upon review of the Petition and the full trial record, we are persuaded that Petitioner has met its burden of showing, by a preponderance of the evidence, that the Portnoy patent is prior art to the '846 patent.

Having determined that the Portnoy patent is prior art under 35 U.S.C. § 102(e), we discuss the remaining references asserted in Ground 1.

3. Overview of Cannady (Ex. 1012)

Cannady is a journal article titled "Artificial Neural Networks for Misuse Detection." Ex. 1012, 1. Cannady presents an analysis of the applicability of neural networks in the identification of instances of external attacks against a network ranging from denial of service attacks to port scans. *Id.* at 1, 7. Cannady explains that an artificial neural network consists of a collection of processing elements that are highly interconnected and transform a set of inputs to a set of desired outputs. *Id.* at 3. A neural network conducts an analysis and provides a probability estimate that the data matches the characteristics which it has been trained to recognize. *Id.*

The neural network gains experience initially by training the system to correctly identify preselected examples of the problem. Ex. 1012, 4. The response of the neural network is reviewed and the configuration of the system is refined until the neural network's analysis of the training data reaches a satisfactory level. *Id.* In addition to the initial training period, the neural network also gains experience over time as it conducts analyses on data related to the problem. *Id.* The constantly changing nature of network attacks requires a flexible defensive system that is capable of analyzing the enormous amount of network traffic in a manner which is less structured than rule-based systems. *Id.*

According to Cannady, a neural network-based misuse detection system could potentially address many of the problems that are found in rule-based systems. *Id.* Cannady describes various advantages of utilizing a neural network in the detection of instances of misuse, including: flexibility, non-linear analysis, speed, and the ability of the neural network to gain experience and improve its ability to determine attacks. *Id.* at 5. Cannady discloses that the most important advantage of neural networks in misuse detection is the ability of the neural network to "learn" the characteristics of misuse attacks and identify instances that are unlike any which have been observed before by the network. *Id.*

Cannady describes two general implementations of neural networks in misuse detection systems: (1) incorporating them into existing or modified expert systems, and (2) involving the neural network as a standalone misuse detection system. *Id.* at 6. Cannady describes a prototype neural network that was designed to test the ability of a neural network to identify indications of misuse. *Id.* at 7. Data for training and testing the prototype was generated using the RealSecure™ network monitor.[11] *Id.* RealSecure™ is designed to be used by network security administrators to passively collect data from the network and identify indications of attacks. *Id.* In addition to the "normal" network activity that was collected as events by RealSecure™, the host for the monitor was "attacked" using the Internet Scanner™.[12] *Id.* Approximately 10000 individual events were collected by RealSecure™ and stored in a Microsoft Access™ database, of which approximately 3000 were

[11] The RealSecure™ network monitor is available from Internet Security Systems, Inc. Ex. 1012, 7.
[12] The Internet Scanner™ is available from ISS, Inc., and the Satan scanner. Ex, 1012, 7.

simulated attacks. *Id.* According to Cannady, the results of the testing demonstrate the potential of a neural network to detect individual instances of possible misuse from a representative network data stream. *Id.* at 9.

4. *Overview of Barbara (Ex. 1013)*

Barbara is a journal article titled "Detecting Novel Network Intrusions Using Bayes Estimators." Ex. 1013, 1. Barbara describes a pseudo-Bayes estimators technique to enhance an anomaly detection system's ability to detect new attacks while reducing the false alarm rate as much as possible. *Id.* at 2. Barbara's method is based on an anomaly detection system called Audit Data Analysis and Mining (ADAM). *Id.* ADAM applies mining association rules techniques to look for the abnormal events in network traffic data, then it uses a classification algorithm to classify the abnormal events into normal instances and abnormal instances. *Id.* The abnormal instances can be further categorized into attack names if ADAM has gained knowledge about the attacks. *Id.*

With the help of the classifier, the number of false alarms is greatly reduced because the abnormal associations that belong to normal instances will be filtered out. Ex. 1013, 2. Barbara explains that the normal instances and attacks that the classifier is able to recognize are limited to those that appear in the training data. *Id.* To overcome this limitation, Barbara describes applying the pseudo-Bayes estimators method as a means to estimate the prior and posterior probabilities of new attacks. *Id.* The method constructs a Naive Bayes classifier to classify the instances into normal instances, known attacks and new attacks. *Id.* According to Barbara, one advantage of pseudo-Bayes estimators is that no knowledge about new attacks is needed since the estimated prior and posterior

probabilities of new attacks are derived from the information of normal instances and known attacks. *Id.*

5. Analysis of Claim 7

Petitioner asserts claim 7 would have been obvious over Portnoy, Cannady, and Barbara. Pet. 30–60; Pet. Reply 16–26. Patent Owner contends that Petitioner has failed to establish that limitations [7.A], [7.B], and [7.C] are taught by the references. PO Resp. 25–32; Sur-Reply 5–8. Patent Owner further contends that there is no motivation to combine Barbara and Portnoy. PO Resp. 22–25; Sur-Reply 8–9.

Petitioner's contentions regarding the preamble and limitations [7.D], [7.E], and [7.F] are undisputed.

We have reviewed the evidence and arguments provided by the parties and are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claim 7 is unpatentable as obvious over Portnoy, Cannady, and Barbara.

We use Petitioner's notations to identify the claim elements.

a) "An intrusion detection method comprising the steps of:"

Petitioner asserts that, to the extent the preamble is limiting, Portnoy discloses this limitation. Pet. 30 (citing Ex. 1004, code (54), 1:52–64, 4:31–34; Ex. 1005, Title, Abstract). We find that Petitioner's contentions, which Patent Owner does not dispute, are persuasive in demonstrating that Portnoy discloses the preamble to the extent it is limiting.

b) "Element [7.A]: monitoring network traffic passing across a network communications path"

Petitioner contends that "Portnoy discloses, or at least renders obvious, this limitation alone or in view of Cannady and/or Barbara." Pet. 30. For example, Petitioner asserts that "Portnoy discloses monitoring

network packets and connections passing across a network communications path in order to build the dataset." Pet. 31 (citing Ex. 1005, 12; Ex. 1004, 8:21–25; Ex. 1002 ¶¶ 121, 126–128) (emphases omitted). Petitioner further asserts that Portnoy describes "how to implement a live system," and explains, "that in practice, this would mean collecting raw data from the network, extracting feature values from it, and training on the resulting set of feature vectors." Pet. 32 (citing Ex. 1005, 12; Ex. 1004, 8:21–25). According to Petitioner, "a POSITA would have understood that collecting data includes the act of monitoring data from the network traffic" (Ex. 1002 ¶ 126) and that "you cannot collect raw data in the manner Portnoy teaches without monitoring." Pet. 32.

In response, Patent Owner contends "the Portnoy Provisional Applications do not disclose a system for the collection of data from an audit stream" (*id.* at ¶ 20 (citing Ex. 2001 ¶ 69)), and as such, neither the Portnoy patent nor the Portnoy Provisional Applications discloses "monitoring network traffic passing across a network communications path," as recited by claim 7. PO Resp. 19, 26–30. However, based on the parties' arguments and the complete record after trial, we agree with Petitioner that "Portnoy discloses monitoring network packets and connections passing across a network communications path in order to build the dataset." Pet. 31 (citing Ex. 1005, 12; Ex. 1004, 8:21–25; Ex. 1002 ¶¶ 121, 126–128) (emphases omitted).

In this regard, Portnoy describes gathering raw network data during simulated intrusions and extracting feature values from the connection records. Ex. 1004, 20:17–23. Portnoy explains that "[a] connection is a sequence of TCP packets to and from some IP addresses" and "[t]he TCP packets were assembled into connection records." *Id.* at 20:23–26. The

Petition relies on disclosure in the Portnoy '196 Provisional of "periodically (every 2 weeks for example) collecting raw data from the network" to support the above disclosure in Portnoy. Ex. 1005, 12. Portnoy also discloses that "[t]he network connection records used were the KDD Cup 1999 Data," "which contained a wide variety of intrusions simulated in a military network environment." Ex. 1004, 20:17–19; *see also* Ex. 1005, 4 ("The dataset used was the KDD Cup 1999 Data" which "contained a wide variety of intrusions simulated in a military network environment.") (footnote omitted). It is apparent from this disclosure of Portnoy that the data gathered during the simulated intrusions includes network connection records based on TCP packets. Ex. 1004, 20:17–36.

Patent Owner argues that

> nothing in [the Portnoy '196 Provisional Application] at p. 12 discloses a system for monitoring network packets or connections. Furthermore, Portnoy '196 Provisional, Ex. 1005, does not describe [a] network communications path. The Portnoy '196 Provisional, Ex. 1005, does not mention the terms monitor, sniff, communication, or path (in any conjugation).

PO Resp. 19 (citing Ex. 2001 ¶ 67). According to Patent Owner, "[t]here was no collection of raw data from a network in" the Portnoy '196 Provisional Application because "[t]he KDD CUP dataset was used" and "[w]hen this did not work, the KDD CUP dataset was modified by Portnoy to reduce the number of attacks that were represented. No POSITA would consider this to be 'collected' or 'raw data.'" *Id.* at 20 (citing Ex. 2001 ¶ 69); *see also id.* at 29 (citing Ex. 2001 ¶ 92) ("[A] POSITA would understand that one can download the KDD CUP dataset and perform data analysis on it without it ever being 'monitored.'").

However, as Petitioner correctly notes, the cited portions of the Portnoy Provisional Applications do not simply refer to the KDD 1999 Cup dataset, but the cited portions also contemplate live implementation. *See* Pet. Reply 8–9 (citing Pet. 32, 37; Ex. 1002 ¶¶ 126–158, 148) ("Portnoy's description of a live implementation demonstrates how a prebuilt dataset, like KDD Cup 1999 Dataset, would be built."). For example, the Portnoy '196 Provisional Application discloses that "[i]n practice, this would mean periodically (every 2 weeks for example) collecting raw data from the network, extracting feature values from it, and training on the resulting set of feature vectors." Ex. 1005, 12. The Portnoy '894 Provisional Application further discloses "[o]ur data is collected from some audit stream of the system." Ex. 1007, 5; *see also id.* ("The key to our framework is mapping the records from the audit stream to a feature space."). In light of these disclosures, we credit Dr. Srivastava's declaration testimony that one of ordinary skill in the art

> would have understood that collecting data includes the act of monitoring data from the audit streams or the network as a whole because in my experience and in the context of the '894 Provisional Application, audit streams are streams of audit data from the network. In fact, Portnoy shares my understanding. Ex. 1004 at 8:21–25 ("one such concrete example of an audit stream may be network packet header data (without the data payload of the network packets) that are 'sniffed' at an audit point in the network."). To have streams we must, in my experience, observe ("monitor") the network traffic.

Ex. 1002 ¶ 126. To the extent Patent Owner relies on paragraphs 67 and 69 of Mr. Jawadi's declaration testimony to rebut Dr. Srivastava's testimony, Mr. Jawadi's testimony merely repeats the Response's assertions word-for-word and, thus, is not supported sufficiently by objective evidence or analysis. For this reason, we do not credit the testimony of Mr. Jawadi on

this issue. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Patent Owner further asserts without any explanation that "Petitioner has not shown how experimenting on simulated data meets the limitation for 'monitoring network traffic.'" PO Resp. 28 (citing Ex. 2001 ¶ 90). However, as Petitioner points out, "[i]n describing how to implement a live system, Portnoy states that in practice, this would mean collecting raw data from the network, extracting feature values from it, and training on the resulting set of feature vectors." Pet. 32 (citing Ex. 1005, 12; Ex. 1004, 8:21–25). And, as we stated in the Decision on Institution, "[w]e see nothing in claim 7 that excludes network traffic that includes *simulated* intrusions. In other words, nothing in claim 7 includes a *bona fide* network attack or intrusion by some malicious entity." Dec. on Inst. 36.

Patent Owner also directs attention to the deposition testimony of Dr. Srivastava. PO Resp. 27; Sur-Reply 5. According to Patent Owner, "Portnoy does not disclose monitoring network traffic passing across a network communications path" because Dr. Srivastava admitted "that the Portnoy '196 Provisional and the Portnoy '894 Provisional do not contain 'any sort of monitoring tool.'" PO Resp. 27 (citing Ex. 2003, 147:11–15). However, as Petitioner correctly points out, claim 7 does not recite a "monitoring tool." Here, we credit, and give greater weight to Dr. Srivastava's declaration testimony that one of ordinary skill in the art "would have understood that you cannot collect raw data in the manner Portnoy teaches without monitoring because in my experience, monitoring network traffic is one of the first steps in collecting information from a network." Ex. 1002 ¶ 127. With this understanding, we agree with

Petitioner that one of ordinary skill in the art "reading Portnoy would find this element obvious at least because Portnoy discloses how the underlying dataset was created and that for a live system "this would mean . . . collecting raw data from the network." Pet. Reply 20 (citing Ex. 1005 4, 12; Pet. 32; Ex. 1002 ¶¶ 126–131). Thus, we find that Petitioner has provided persuasive evidence that both Portnoy and the Portnoy Provisional Applications disclose "monitoring network traffic passing across a network communications path," as required by claim 7, for the reasons set forth in the Petition. Pet. 31 (citing Ex. 1005, 12; Ex. 1004, 8:21–25; Ex. 1002 ¶¶ 121, 126–128) (emphases omitted).

Even if Portnoy does not explicitly disclose "monitoring network traffic passing across a network communications path," as recited by element [7.A], Petitioner contends that "it would have been obvious to a POSITA to *monitor*, as taught by Cannady, the TCP packets (*network traffic*) *passing across* the connection to and from IP addresses or the connection in a military network environment (*network communications path*) of Portnoy." Pet. 32 (citing Ex. 1012). Petitioner asserts that "Cannady discloses that intrusion detecting includes 'receiv[ing] data from the network stream and analyz[ing] the information for instances of misuse.'" *Id.* (citing Ex. 1012, 6) (emphasis omitted). Petitioner explains that Cannady discloses a network packet monitoring tool, i.e., "RealSecure™ monitor," that is configured to "capture the data for each event which would be consistent with a network frame" and is designed "to passively collect data from the network." *Id.* at 32–33 (citing Ex. 1012, 7 (emphasis omitted); Ex. 1002 ¶¶ 132–133). Petitioner provides several reasons why one of ordinary skill in the art would have turned to the analogous art of Cannady "to apply the well-known teaching of *monitoring*

to Portnoy's *network traffic passing across a network communications path*." *Id.* at 34–36 (citing Ex. 1002 ¶¶ 126–128, 137, 139–145; Ex. 1012, 1, 7, 9–12; Ex. 1013, 1–4, 11–15).

In response, Patent Owner argues that one of ordinary skill in the art would not have considered Cannady to have disclosed "monitoring network traffic passing across a communication path" because "Cannady openly admits to not having a working system." PO Resp. 26 (citing Ex. 2001 ¶ 81); Sur-Reply 6–7 (citing Ex. 2001 ¶ 83). According to Patent Owner, Petitioner overlooks the "Future Work" section of the Cannady paper, which

> states that "[a] complete system will require the ability to directly receive inputs from a network data stream. The most difficult component of the analysis of network traffic by a neural network is the ability to effectively analyze the information in the data portion of an IP datagram. The various commands that are included in the data often provide the most critical element in the process of determining if an attack is occurring against a network."

PO Resp. 26 (quoting Ex. 1012, 11); Ex. 2001 ¶ 81. Patent Owner's argument does not undermine Petitioner's showing.

Patent Owner's assertion that Cannady cannot teach "monitoring network traffic passing across a communication path" because of the difficulties related to the "analysis of network traffic by a neural network" (PO Resp. 26), fails to address Petitioner's primary argument, i.e., that Cannady teaches the use of commercially available monitoring tool to monitor network traffic, as claim 7 requires. Pet. 32–33 (citing Ex. 1012, 6, 7; Ex. 1002 ¶¶ 132–133). Rather than address Petitioner's argument and evidence, Patent Owner, relying on its expert, Mr. Jawadi, asserts that one of ordinary skill in the art would not have "consider[ed] Cannady to have disclosed 'monitoring network traffic passing across a communication

path.'" Sur-Reply 7 (citing Ex. 2001 ¶ 83). According to Mr. Jawadi, "Cannady indicates that Cannady does not describe a complete system" and "does not suggest that using RealSecure would be viable [in a neural network], because Cannady requires the ability to 'directly receive inputs.'" Ex. 2001 ¶ 83 (citing Ex. 1012, 11).

However, as Petitioner correctly notes, it is unclear how any difficulties with neural networks or Cannady's discussion about its "Future Work" otherwise negates its teachings regarding "RealSecure™ monitor." *See* Ex. 1012, 7 ("RealSecure™ is designed to be used by network security administrators to passively collect data from the network and identify indications of attacks."). We credit Dr. Srivastava's declaration testimony that "Cannady's RealSecure™ is just one example of well-known and commercially available tools for monitoring network traffic." Ex. 1002 ¶ 133. Thus, we agree with Petitioner and Dr. Srivastava that one of ordinary skill in the art would have understood that applying Cannady's "known techniques to Portnoy's known system would achieve the predictable result of a real-world version of Portnoy that monitors network traffic." Pet. 35 (citing Ex. 1002 ¶¶ 139–145).

Even if Portnoy and Cannady do not explicitly disclose the argued limitation, Petitioner contends that Barbara separately discloses monitoring network traffic. Pet. 33 (citing Ex. 1013, 2). According to Petitioner, Barbara discloses that its "preprocessing engine sniffs TCP/IP traffic data, and extracts information from the header of each connection." *Id.* (quoting Ex. 1013, 2); Ex. 1002 ¶ 134.

Based on the above, Petitioner concludes that

> Portnoy alone, or in combination with Cannady or Barbara, discloses, or renders obvious, Element [7.A]. Ex. 1002 at

> ¶[¶]135–136. Specifically, Portnoy combined with Cannady would result in Portnoy's intrusion detection system that monitors network traffic using Cannady's teachings of the RealSecure™ monitor, or similar tools. Ex. 1002 at ¶[¶]139–140. Also, Portnoy combined with Barbara would result in an intrusion detection system ("IDS") incorporating the teachings of preprocessing module that sniffs TCP/IP traffic. *Id.*

Pet. 33–34. Petitioner provides several reasons why one of ordinary skill in the art would have turned to the analogous art of Barbara "to apply the well-known teaching of *monitoring* to Portnoy's *network traffic passing across a network communications path*." *Id.* at 34–36 (citing Ex. 1002 ¶¶ 126–128, 137, 139–145; Ex. 1012, 1, 7, 9–12; Ex. 1013, 1–4, 11–15).

Patent Owner does not dispute Petitioner's contentions regarding Barbara with respect to this limitation. PO Resp. 30. Instead, Patent Owner's argument is that "there is no motivation to combine Portnoy with Barbara." *Id.*; Sur-Reply 8–9.

Patent Owner asserts that Portnoy is directed to unsupervised anomaly detection which "does not require a purely normal training set" and can detect anomalies over unlabeled or raw data. PO Resp. 22–24; Sur-Reply 8–9. However, in contrast, Patent Owner contends that Barbara's anomaly detection system detects new attacks using a supervised anomaly detection method which requires a large training set. PO Resp. 24–25; Sur-Reply 8–9. According to Patent Owner,

> [b]ecause the system disclosed in Portnoy's patent sets out to detect anomalies in an unsupervised environment with a small training set, and because Barbara attempts to detect anomalies in a supervised setting, with a large training set, there would be no motivation to combine. Ex. 2001, ¶ 81. For example, Barbara requires the labeling of data, and a data mining period with no attacks. *Id.* After the data is mined, Barbara analyzes the data using a probabilistic approach. *Id.* A POSITA would view these

> are two very different approaches to anomaly detection, and would not choose to combine them. *Id.*

PO Resp. 25; Sur-Reply 8.

Petitioner responds that "[w]hether Barbara and Portnoy use different anomaly detection approaches is irrelevant." Pet. Reply 16. Petitioner adds that it "does not rely on to Barbara to 'identify anomalous behavior,'" as limitation [7.E] recites.[13] Pet. Reply 16 (citing Pet. 49–52). Relying on the declaration testimony of its expert, Dr. Srivastava, Petitioner asserts that one of ordinary skill in the art "would turn to Barbara for pre and post anomaly detection activity that "merely tak[e] the next logical step from proof of concept to live system" or "further refine Portnoy's system and reduce false positives." *Id.* (citing Ex. 1002 ¶ 139, 168, 174, 236, 241–242; Pet. 34–35, 39–41, 55.57).

Petitioner explains that "Barbara details of how to 'monitor[]' and 'extract[]' information used by Portnoy's anomaly detection, and how to 'classify[]' an anomaly after it has been detected." *Id.* at 16–17 (citing Pet. 32–36, 37–41, 53–57). And, according to Petitioner, "Patent Owner does not dispute that Barbara teaches these elements and provides no reason why using a different form of anomaly detection would impact pre or post anomaly detection processes." *Id.*

In response, Patent Owner asserts that the statements made by "Petitioner are incorrect." Sur-Reply 8. Relying on its expert, Mr. Jawadi, Patent Owner concludes that because Portnoy is directed to an unsupervised system and Barbara is directed to a supervised system, one of ordinary skill

[13] As discussed below in Section III.D.5.F, Petitioner asserts that "Portnoy discloses, or at least renders obvious, Element [7.E]." Pet. 49–52. Patent Owner does not dispute Petitioner's contentions regarding limitation [7.E].

in the art "would view these as two very different approaches to anomaly detection and would not choose to combine them." *Id.* (citing Ex. 2001 ¶ 80).

We have considered Patent Owner's arguments, but they do not undermine Petitioner's showing. Although Mr. Jawadi testifies in support of Patent Owner's position, we find the testimony of Dr. Srivastava more credible on this issue. Ex. 1002 ¶ 139, 168, 174, 236, 241–247. Mr. Jawadi's declaration merely parrots the Patent Owner Response without providing a persuasive explanation for the assertion that a person of ordinary skill in the art would not "choose to combine" Portnoy and Barbara. PO Resp. 25; Sur-Reply 8; *compare* Ex. 2001 ¶ 80. As Petitioner correctly notes, "Patent Owner does not dispute that Barbara's approach to 'monitoring' and 'extracting' are examples of widely known techniques that any POSITA would have known." Pet. Reply 17 (citing Pet. 32–41; Ex. 1002 ¶ 127–135, 139, 155–164). And, other than asserting that Barbara and Portnoy use different techniques for classification, Patent Owner does not identify any particular obstacle that a person of ordinary skill in the art would have understood to exist by using Barbara's classifiers to process the output of Portnoy's analysis. Pet. 55 (citing Ex. 1002 ¶¶ 230, 245–247).

For these reasons, we find and determine that Petitioner persuasively shows that "Portnoy discloses, or at least renders obvious, this limitation alone or in view of Cannady and/or Barbara."

c) "Element [7.B]: extracting network packets from said passing traffic"

Petitioner contends that that "Portnoy alone, or in view of Cannady or Barbara, discloses, or at least renders obvious, Element [7.B]." Pet. 36. For example, Petitioner asserts

> [a] POSITA would have understood that Portnoy's proven algorithm teaches, or at least renders obvious, *extract[ion] of network packets* resulting in the prebuilt dataset because data, even if simulated, has to be acquired from somewhere in order to be analyzed. *See* Ex. 1002 at ¶146–155. At the very least, extraction of packets is a common, if not the most common, way of gathering such data. *See* Ex. 1002 at ¶163.

Pet. 36–37. Petitioner further asserts that Portnoy discloses "collect[ing] raw data from the network" (Pet. 37 (quoting Ex. 1005, 12)) and collecting data "from some audit stream" (Pet. 37 (quoting Ex. 1007, 5)), and as such, one of ordinary skill in the art "would have understood that collecting raw data and data from networks and audit streams, respectively, is, or at least renders obvious, *extracting network packets from said passing traffic*." Pet. 37 (citing Ex. 1002 ¶ 148).

In response, Patent Owner contends that neither the Portnoy patent nor the Portnoy Provisional Applications discloses "extracting network packets," as recited by claim 7. PO Resp. 17. Patent Owner argues that Petitioner improperly asserts that "'Portnoy operates by first extracting network traffic information'" when claim 7 requires "extracting network packets." *Id.* (quoting Pet. 8 (citing Ex. 1005, 2, 4, 7; Ex. 1004, 8:21–34)). According to Patent Owner the Portnoy '196 Provisional Application "only mentions extracting features, not extracting packets." *Id.* at 18 (citing Ex. 2001 ¶ 59).

However, the Portnoy patent discloses that a connection record obtained from raw network data are "a sequence of TCP packets." Ex. 1004, 20:23–24; *see also* Ex. 1005, 4 ("[a] connection is a sequence of TCP packets . . ."). We credit Dr. Srivastava's statement that one of ordinary skill in the art

> would have understood that Portnoy necessarily requires, or at least suggests, extracting network packets in order to build Portnoy's prebuilt dataset, or as Portnoy puts it, "feature vectors collected from the network." *See* Ex. 1005 at p. 12; Ex. 1004 at 20:21–23. Moreover, collecting data from audit streams is, or at least a POSITA [would] have understood that is, "extracting" as claimed. Ex. 1007 at p. 5; Ex. 1005 8:21–25.

Ex. 1002 ¶ 148. Patent Owner has not offered any persuasive argument or technical reasoning to explain how the claimed "extracting network packets from said passing traffic" is patentably distinguishable over the gathering of network data, including network packets (TCP packets), disclosed in both Portnoy and the Portnoy Provisional Applications.

Patent Owner's reliance on paragraph 59 of its expert, Mr. Jawadi's declaration testimony, does little to alter our conclusion. Here, Mr. Jawadi simply states

> in my opinion, the Portnoy '894 Provisional, alone or in combination with the Portnoy '196 Provisional discussed above, does not contain a written description of the invention of the Portnoy '966 Patent in full, clear, concise, and exact terms to enable a POSITA to practice the inventions claimed in the Portnoy '966 Patent.

Ex. 2001 ¶ 59. Mr. Jawadi's declaration testimony is conclusory, is not supported sufficiently by any objective evidence or analysis and, thus, is entitled to little, if any, weight. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). Thus, we find that Petitioner has provided sufficient evidence that both Portnoy and the Portnoy Provisional Applications disclose "extracting network packets from said passing traffic," as required by claim 7, for the reasons set forth in the Petition. Pet. 36–37 (citing Ex. 1005, 12; Ex. 1007, 5; Ex, 1004, 8:21–25; Ex. 1002 ¶¶ 146–155).

Even if Portnoy does not explicitly disclose "extracting network packets from said passing traffic," Petitioner contends that "it would have been obvious to a POSITA to *extract*, as taught by Cannady, TCP packets (*network packets*) from the passing traffic of TCP packets flowing across the connection." Pet. 37 (citing Ex. 1002 ¶¶ 154–155). Petitioner asserts that Cannady's RealSecure™ monitor is configured to collect data from the network and "capture the data for each event which would be consistent with a network frame." Pet. 37 (citing Ex. 1012, 7). Petitioner explains that one of ordinary skill in the art "would have understood that network frames correspond to network packets" (Pet. 38 (citing Ex. 1002 ¶ 157)), and "Cannady confirms this when disclosing the type of information RealSecure™ collects and how Cannady's analysis uses such information." Pet. 38 (citing Ex. 1012, 7–8; Ex. 1002 ¶¶ 157–159).

Petitioner also contends that "Barbara teaches, or renders obvious, "extracting network packets from said passing traffic," as recited by element [7.B]. Pet. 38–39. For example, Petitioner asserts that Barbara discloses "'look[ing] at TCP/IP traffic, and generat[ing] a record for each connection from the header information of its packets.'" Pet. 38 (quoting Ex. 1013, 4). According to Petitioner, "[a] POSITA would have understood that to 'generate a record for each connection from the header information of its packets' the packets are extracted." Pet. 38 (citing Ex. 1002 ¶ 161).

Based on the above, Petitioner concludes that

> Portnoy alone, or in combination with Cannady or Barbara, discloses, or render obvious Element [7.B]. Ex. 1002 at ¶[¶]165–175. Specifically, Portnoy combined with Cannady would result in an IDS that uses the teachings of well-known commercial tools to extract network packets. Ex. 1002 at ¶[¶]167–170. And Portnoy combined with Barbara would result in an IDS that uses

> well-known packet sniffing techniques to extract network packets. *Id.*

Pet. 39. Petitioner provides several reasons why one of ordinary skill in the art "would have been motivated to combine the teachings of Cannady and/or Barbara" to Portnoy's intrusion detection system. Pet. 39–41 (citing Ex. 1002 ¶¶ 147–150, 166–175; Ex. 1004, 8:21–25; Ex. 1005, 12; Ex. 1012, 7).

Patent Owner does not dispute Petitioner's contentions regarding Cannady or Barbara with respect to this limitation. PO Resp. 30. Instead, Patent Owner asserts

> Portnoy, Cannady and Barbara do not render obvious "monitoring a network communication path." Portnoy and Cannady do not disclose monitoring network traffic passing across a communication path, and there is no motivation to combine Portnoy with Barbara. For the same reasons, there is no disclosure of "extracting network packets from said passing traffic."

Id.

Patent Owner's argument does not undermine Petitioner's showing. For the reasons discussed above, and in Section III.D.5.A, Petitioner persuasively shows that "Portnoy alone, or in view of Cannady or Barbara, discloses, or at least renders obvious "extracting network packets from said passing traffic."

d) "Element [7.C]: storing individual components of said network packets in a database"

Petitioner contends that "Portnoy, alone or in combination with Cannady, discloses, or at least renders obvious, Element [7.C]." Pet. 41. For example, Petitioner asserts that Portnoy's disclosure of "extracted features" from TCP connections is equivalent to "individual components of said network packets." Pet. 41 (citing Ex. 1005, 4; Ex. 1004, 20:44–58).

Petitioner further asserts that Portnoy discloses storing this information "in a database" as claimed because the KDD Cup 1999 Dataset is "a database." Pet. 42 (citing Ex. 1005, 4; Ex. 1004, 20:18–58). According to Petitioner, one of ordinary skill in the art "would have understood that the information Portnoy uses is *individual components of network packet*s because TCP connections are actually just network packets and exist within the data contained in the packets thus descriptions or data about TCP connections comes from data in the network packets." Pet. 42 (citing Ex. 1002 ¶ 179).

In response, Patent Owner contends that

> Petitioner does not point to a single disclosure of a database within any of the Portnoy references. Instead, Petitioner merely suggests that since the '966 Patent refers to "extracted features" of a TCP Connection, that "a POSITA would have understood that Portnoy discloses, or at least suggests, storing individual components in its dataset."

PO Resp. 30–31.

Patent Owner's argument does not undermine Petitioner's showing. Instead, we agree with Petitioner that the Portnoy Provisional Applications "disclose the KDD Cup 1999 Dataset, which is a database storing extracted features of network packets (i.e., central location to store data), and an example of the data that a live system would collect and store." Pet. Reply 11 (citing Petition 42–43; Ex. 1002 ¶179–183). Petitioner's position is supported by Dr. Srivastava's opinion that one of ordinary skill in the art would

> have understood that a live implementation of Portnoy would necessarily require, or at least it would have been obvious to a POSITA that Portnoy would need to carry out, "storing individual components of said network packets in a database" in order to store the same kind of information stored in the prebuilt

> data set. Otherwise, Portnoy would not have the data needed to perform its analysis.

Ex. 1002 ¶ 181.

Patent Owner disagrees. Relying on the declaration testimony of Mr. Jawadi, Patent Owner asserts that "[t]he implementation of a database connected to a system which monitors a communication stream and extracts data would not have been an [sic] obvious, nor do I find it suggested anywhere in the Portnoy references." PO Resp. 31 (citing Ex. 2001 ¶ 99). However, we find such reliance to be unpersuasive because Mr. Jawadi simply parrots Patent Owner's argument and provides little if any analysis of in support of Patent Owner's disagreement. Instead, we credit and give greater weight to Dr. Srivastava's declaration testimony that one of ordinary skill in the art would have understood that Portnoy discloses or suggests storing individual components in its dataset. *See* Ex. 1002 at ¶176–183.

However, to the extent that Portnoy does not disclose "storing individual components of said network packets in a database," Petitioner contends that it would have been obvious to one of ordinary skill in the art "to store individual components in a database such as a Microsoft Access™ database in view of Cannady's teaching." Pet. 43 (citing Ex. 1002 ¶¶ 184–195); *see also* Pet. 43 (citing Ex. 1012 ("Cannady discloses that 100,000 individual events where [sic – were] stored in a Microsoft Access™ database.")). According to Petitioner one of ordinary skill in the art "would have understood that Cannady's database stores individual components of the network packets." Pet. 43–44 (citing Ex. 1002 ¶ 193–195).

Based on the above, Petitioner concludes that the combination of Portnoy and Cannady discloses or renders obvious the argued limitation. Pet. 44 (Citing Ex. 1002 ¶¶ 196–204). Petitioner explains that "Portnoy

combined with the teachings of Cannady results in using a commercially available database for storing Portnoy's individual components of network packets." *Id.* Petitioner provides several reasons why "[a] POSITA would have been motivated to apply the teachings of Cannady's commercially available database to Portnoy's IDS to facilitate improved data management and retention." Pet. 44–46 (citing Ex. 1002 ¶¶ 198, 200–204; Ex. 1004, 18:48–63, 20:59–21:4; Ex. 1005, 4–7, 13; Ex. 1012, 5–6, 8).

In response, Patent Owner contends that "Cannady discusses databases a single time in its disclosure" and "does not disclose storing individual components of networks packets in a database." PO Resp. 31; Sur-Reply 7–8.[14] Patent Owner also argues that "Petitioner does not explain how using pieces of network data renders obvious the step of storing individual components of said packets in a database obvious." Sur-Reply 7 (citing Ex. 2002 ¶¶ 36, 50, 65, 73, 99).

Patent Owner's arguments do not undermine Petitioner's showing. At the outset, Petitioner's obviousness approach adequately identifies how the combination of Portnoy and Cannady renders obvious limitation [7.C], and is supported by citation to Dr. Srivastava's declaration testimony. Pet. 43–46 (citing Ex. 1002 ¶¶ 184–204). There is no dispute as to whether Cannady discloses storing data in a database. *See* Ex. 1012, 7 ("Approximately 10000 individual events were collected by RealSecure™ and stored in a Microsoft Access™ database, of which approximately 3000 were simulated attacks."). Instead, Patent Owner asserts that Cannady discloses "storing "events"

[14] Patent Owner also argues that Barbara fails to disclose limitation [7.C]. PO Resp. 31. However, Petitioner does not rely on Barbara to address limitation [7.C] (Pet. 41), and as such, we do not address Patent Owner's arguments directed to whether Barbara discloses limitation [7.C].

collected by RealSecure in a Microsoft Access database. PO Resp. 31 (citing Ex. 1012, 7). However, we credit the declaration testimony of Dr. Srivastava for the understanding that the "events" in Cannady "are each just a record of a packet broken down into its individual components." Ex. 1002 ¶ 185. Thus, we agree with Petitioner that one of ordinary skill in the art "would have understood that Cannady's database stores individual components of the network packets," as claim 7 requires. Pet. 43–44 (citing Ex. 1002 ¶ 193–195).

For these reasons, Petitioner persuasively shows that "Portnoy, alone or in combination with Cannady, discloses, or at least renders obvious, Element [7.C]."

e) "Element [7.D]: constructing multi-dimensional vectors from at least two of said stored individual components and applying at least one multi-variate analysis to said constructed multi-dimensional vectors, said at least one multi-variate analysis producing a corresponding output set"

Petitioner contends that "Portnoy discloses or renders obvious this limitation." Pet. 46–49. For example, Petitioner asserts that

> Portnoy discloses obtaining a "data instance (feature vector)" (*multi-dimensional vectors*) from the KDD Cup 1999 dataset and discloses an example of a feature vector having three features. Ex. 1005 at pp. 4–5, 7; *see also* Ex. 1004 at 11:54–12:52, 13:8–10. Further, Portnoy's feature vectors are multidimensional because Portnoy teaches normalizing vectors to avoid bias cause by different feature scales, which does not occur in single dimensional feature vectors with only one scale. Ex. 1005 at pp. 4–5; *see also* Ex. 1004 at 11:54–12:53; Ex. 1002 at ¶208. And as mentioned, Portnoy gives an example of a feature vector with three features. Ex. 1005 at pp. 4–5, Ex. 1004 at 11:54–12:52.

Pet. 47. And, according to Petitioner, one of ordinary skill in the art

> would have understood that Portnoy obtains multi-dimensional vectors from at least two of said stored individual components

> constructed from the raw network traffic because a feature vector is a set of features which represent some object, such as a TCP connection or packet; in addition, Portnoy discloses a three-feature vector in an example. *See id.*; Ex. 1002 at ¶[¶]206–208; *see also* Ex. 1023 at Fig. 3 (illustrating that a feature vector is made up of feature elements), 19:52–20:18 (claiming constructing a multidimensional feature vector from data representing a gesture and using the vector in neural network analysis).

Pet. 47–48. Petitioner further asserts that "Portnoy applies a simple variant of single-linkage clustering (*at least one multi-variate analysis*) to a feature vector (*multi-dimensional vectors*)." Pet. 48 (citing Ex. 1002 ¶¶ 209–210; Ex. 1005, 5–6). And, with respect to "producing a corresponding output set," Petitioner explains that one of ordinary skill in the art "would have understood that variants of single-linkage clustering produce a set of clusters (*a corresponding output set*)." Pet. 49 (citing Ex. 1005, 5–6; Ex. 1002 ¶ 209); *see also* Pet. 49 ("A POSITA would have understood that to obtain the multi-dimensional vectors, they are constructed.") (citing Ex. 1002 ¶ 211).

Petitioner additionally asserts that "Cannady shows an example of selecting certain elements from a database record and further constructing them." Pet. 49 (citing Ex. 1012, 8; Ex. 1002 ¶¶ 211–215).

We find that Petitioner's contentions regarding this limitation, which Patent Owner does not dispute, are persuasive.

f) "Element [7.E]: establishing a correlation between individual output sets based upon a selected metric to identify anomalous behavior"

Petitioner contends that "Portnoy discloses, or at least renders obvious, Element [7.E]." Pet. 49–52. For example, Petitioner asserts that "Portnoy *establishes a correlation* in an individual output set, produced by

Portnoy's clustering methodology, based on whether they are part of some N percentage of largest clusters (N being the *selected metric*)." Pet. 50 (citing Ex. 1002 ¶¶ 226–228; Ex. 1005, 6; Ex. 1004, 13:47–51). Petitioner further asserts that

> Portnoy determines some percentage N (selected metric) of the clusters containing the largest number of instances and marks then as normal (establishing a correlation). Ex. 1005 at p. 6; Ex. 1004 at 13:47–51; *see also* Ex. 1002 at ¶[¶]226–228. The remaining clusters are labeled as anomalous (establishing a correlation). Ex. 1005 at p. 6; Ex. 1004 at 13:47–51. Which clusters are correlated as anomalous and which are correlated as normal depends on what N is used (establishing a correlation between individual output sets based upon a selected metric) and Portnoy discloses various examples of a possible N. Ex. 1005 at p. 8; *see also* Ex. 1002 at ¶[¶]226–228[.]

Pet. 50.

We find that Petitioner's contentions regarding this limitation, which Patent Owner does not dispute, are persuasive.

g) "Element [7.F]: classifying said anomalous behavior as an event selected from the group consisting of a network fault, a change in network performance and a network attack."

Petitioner contends that "Portnoy alone, or combined with Barbara, discloses, or at least render obvious, Element [7.F]." Pet. 52–57. For example, Petitioner asserts that Portnoy's method "help[s] analysts focus on portions of the data that are more likely to contain intrusions." Pet. 52 (citing Ex. 1005, 13). According to Petitioner, one of ordinary skill in the art

> would have understood that the analysts would review the data and determine if the identified portion of data (*said anomalous behavior*) is an intrusion (a*n event selected from the group consisting of... a network attack*) or some acceptable deviation from normal behavior because that is the nature of an analyst's

> role in reviewing data or at the very least a common, well-known aspect of an analyst's role.

Pet. 52 (citing Ex. 1002 ¶¶ 232–233).

However, to the extent that Portnoy does not disclose "classifying said anomalous behavior as an event," Petitioner contends that one of ordinary skill in the art "would have found it obvious to classify, as taught by Barbara, the identified anomalous data instances (anomalous behavior) of Portnoy." Pet. 53 (citing Ex. 1002 ¶¶ 236–248) (emphasis omitted). Petitioner asserts that

> Barbara discloses the ADAM anomaly detection system, which includes . . . a classifier that uses a decision tree to determine (*classifying*) whether anomalous behavior (*said anomalous behavior*) is a deviating normal instance, a known attack (*network attack*), which are labeled with their attack type, or an unknown attack (*network attack*).

Pet. 53 (citing Ex. 1013, 3–5; Ex. 1002 ¶¶ 237–239). Petitioner further asserts that "Barbara discloses using 'a Naive Bayes classifier to classify the instances into normal instances, known attacks and new attacks.'" Pet. 54 (citing Ex. 1013, 2) (emphasis omitted).

Based on the above, Petitioner concludes that "Portnoy in combination with Barbara discloses or renders obvious Element [7.F] by applying the teachings of Barbara's classifiers to review Portnoy's detected anomalies and sort out attacks from permissible deviations." Pet. 55 (citing Ex. 1002 ¶¶ 230, 245–247); *see also id.* at 56 (citing Ex. 1002 ¶¶ 240–248 ("Barbara'[s] teachings would build on Portnoy because Barbara's classifiers would act as a second line of defense by sorting and classifying Portnoy's detected anomalies."). Petitioner provides several reasons why "[a] POSITA would have been motivated to combine the teachings of Barbara's . . . with Portnoy's IDS." Pet. 55–57 (citing Ex. 1002 ¶¶ 240–248;

Ex. 1004, 1:52–64, 4:31–42; Ex. 1005, Abstract; Ex. 1013, 2–3). For example, Petitioner asserts that one of ordinary skill in the art "would have been motivated to incorporate either classification approach of Barbara to automate Portnoy's manual approach, and reduce the false positives rates, and/or proactively determine that nature of the attack." *Id.* at 55 (citing Ex. 1013, 2–3; Ex. 1002 ¶¶ 241–242).

We find that Petitioner's contentions regarding this limitation, which Patent Owner does not dispute, are persuasive.

6. Analysis of Claim 8

Claim 8 depends from claim 7, and further recites "wherein said storing step comprises the steps of: identifying protocol boundaries in each extracted network packet; and, storing data from each field separated by said identified protocol boundaries in a separate record in said database."

Petitioner contends that "Portnoy in view of Cannady discloses, or at least renders obvious," claim 8. Pet. 57–60. Petitioner persuasively maps the limitations of dependent claim 8 to the cited art with support provided by the declaration testimony of Dr. Srivastava. *Id.* (citing Ex. 1002 ¶¶ 185, 252–253, 258–261, 263–271; Ex. 1012, 7–8; Ex. 1018; Ex. 1019; Ex. 1020).

We find Petitioner's arguments and evidence, which Patent Owner does not dispute, are persuasive. We determine, for the reasons expressed by Petitioner, that the combination of Portnoy and Cannady teaches or suggests the limitations of claim 8 and that one of ordinary skill in the art would have been motivated to combine the references in the manner proposed by Petitioner.

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 8 would have been obvious in view of Portnoy and Cannady.

7. Conclusion (Ground 1)

Having considered the parties' arguments and evidence, we find Petitioner has demonstrated persuasively that the teachings of Portnoy and Cannady and/or Barbara have been properly combined and one of ordinary skill in the art would have found it obvious to combine these teachings in the manner proposed by Petitioner.

Therefore, after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has shown by a preponderance of the evidence that claims 7 and 8 are unpatentable over the combination of Portnoy, Cannady, and Barbara.

E. Alleged Obviousness over Portnoy, Cannady, Barbara, and AAPA (Ground 2: Claims 10 and 11)

Petitioner contends that claims 10 and 11 are unpatentable as obvious over Portnoy, Cannady, Barbara, and AAPA. Pet. 60–70. Petitioner also relies on the testimony of Dr. Srivastava to support its arguments. *Id.*

1. Overview of AAPA (Ex. 1001)

Petitioner asserts that "the '846 patent admits 'well-known principal component analysis can be applied to the multi-dimensional vectors in order to facilitate the reduction of the multi-dimensional vectors.'" Pet. 61 (citing Ex. 1001, 9:4–7).[15]

[15] "[A]dmissions by the applicant in the specification of the challenged patent standing alone cannot be used as the basis for instituting an IPR," but "[s]tatements in a challenged patent's specification may be used . . . when they evidence the general knowledge possessed by someone of ordinary skill in the art" if used "in conjunction with one or more prior art patents or printed publications forming 'the basis' of the proceeding under § 311." USPTO Memorandum, Treatment of Statements of the Applicant in the Challenged Patent in Inter Partes Reviews Under § 311 (August 18, 2020) 4,

2. Analysis of Claim 10

Claim 10 follows:

> The method of claim 7, wherein said step of applying at least one multi-variate analysis to said constructed multi-dimensional vectors comprises the steps of: reducing said constructed multi-dimensional vectors; and, applying at least one self-organizing clustering methodology to said reduced multi-dimensional vectors, said application of said at least one self-organizing clustering methodology producing a corresponding output set of clusters.

Ex. 1001, 12:7–16.

Petitioner contends that "Portnoy in view of AAPA discloses, or at least renders obvious," claim 10. Pet. 60–66. Petitioner persuasively maps the limitations of dependent claim 10 to the cited art with support provided by the declaration testimony of Dr. Srivastava. *Id.* (citing Ex. 1001, 9:4–7; Ex. 1002 ¶¶ 279–286, 288–292; Ex. 1004, 11:54–12:53, 13:8–14:27; Ex. 1005, 3–7; Ex. 1021, 13:25–38, 13:65–14:20; Ex. 1022, 12, Fig. 4).

We find that Petitioner's arguments and evidence, which Patent Owner does not dispute, are persuasive. We determine, for the reasons expressed by Petitioner, that the combination of Portnoy and AAPA teaches or suggests the limitations of claim 10 and that one of ordinary skill in the art would have been motivated to combine the references in the manner proposed by Petitioner.

3. Analysis of Claim 11

Claim 11 recites:

> The method of claim 10, wherein said establishing step comprises the steps of: loading at least one selectable metric; correlating individual ones of said clusters in said output set;

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available at https://www.uspto.gov/sites/default/files/documents/signed_aapa_guidance_memo.pdf ("§ 311 Memorandum")."

> determining whether any of said correlations deviate from said loaded at least one selectable metric; and, for each one of said correlated clusters in said output set which deviates from said loaded at least one selectable metric, labeling said deviating correlated cluster as exhibiting anomalous behavior.

Ex. 1001, 12:17–29.

Petitioner contends that "Portnoy discloses, or renders obvious," claim 11. Pet. 66–70. Petitioner persuasively maps the limitations of dependent claim 11 to the cited art with support provided by the declaration testimony of Dr. Srivastava. *Id.* (citing Ex. 1002 ¶¶ 206, 296–298, 300–302, 304–312; Ex. 1004 at 13:32-51; Ex. 1005, 2–3, 6–8).

We find that Petitioner's arguments and evidence, which Patent Owner does not dispute, are persuasive. We determine, for the reasons expressed by Petitioner, that the combination of Portnoy teaches or suggests the limitations of claim 11 and that one of ordinary skill in the art would have understood the references in the manner proposed by Petitioner.

4. Conclusion (Ground 2)

Having considered the parties' arguments and evidence, we determine that Petitioner has demonstrated persuasively that the teachings of Portnoy, Cannady, Barbara, and AAPA have been properly combined and one of ordinary skill in the art would have found it obvious to combine these teachings in the manner proposed by Petitioner.

Therefore, after having analyzed the entirety of the record and assigning appropriate weight to the cited supporting evidence, we determine Petitioner has shown by a preponderance of the evidence that claims 10 and 11 are unpatentable over the combination of Portnoy, Cannady, Barbara, and AAPA.

IV. PETITIONER'S MOTION TO EXCLUDE

Petitioner filed a motion to exclude certain paragraphs of Mr. Jawadi's declaration (Ex. 2001). Mot. 3–9. Petitioner asserts that paragraphs 51, 55, 56, 60–63, 75, 82–87, 96–98, and 103–149 of Mr. Jawadi's declaration should be excluded because Patent Owner does not cite to them. *Id.* at 2–3. Petitioner further asserts that paragraphs 50, 52, 53, 58, 59, 65–74, 76, and 77 of Mr. Jawadi's declaration should be excluded because they "are either verbatim or near verbatim duplication of the [Patent Owner Response] and are only cited in passing in Patent Owner's Sur-Reply." *Id.* at 7. Patent Owner filed an Opposition to Petitioner's Motion (Opp.), and Petitioner filed a Reply in support of its Motion (Reply).

Although we may have explicitly or implicitly referenced these exhibits when recounting or addressing the parties' arguments, we do not rely on any of the referenced paragraphs as a basis to make any findings adverse to Petitioner in this Decision. We, therefore, dismiss Petitioner's Motion to Exclude as moot.

Our general approach for considering challenges to the admissibility of evidence was outlined in *Corning Inc. v. DSM IP Assets B.V.*, IPR2013-00053, Paper 66 at 19 (PTAB May 1, 2014). As stated in *Corning*, similar to a district court in a bench trial, the Board, sitting as a non-jury tribunal with administrative expertise, is well-positioned to determine and assign appropriate weight to evidence presented. *Id.* (citing *Donnelly Garment Co. v. NLRB*, 123 F.2d 215, 224 (8th Cir. 1941) (stating, in the context of reviewing an administrative determination of the National Labor Relations Board based on findings by a Trial Examiner, "[w]e think that experience has demonstrated that in a trial or hearing where no jury is present, more time is ordinarily lost in listening to arguments as to the admissibility of

evidence and in considering offers of proof than would be consumed in taking the evidence proffered . . . . One who is capable of ruling accurately upon the admissibility of evidence is equally capable of sifting it accurately after it has been received . . . .")).

Moreover, "there is a strong public policy for making all information filed in an administrative proceeding available to the public." *Liberty Mut. Ins. Co. v. Progressive Cas. Ins. Co.*, CBM2012-00010, Paper 59 at 40 (PTAB Feb. 24, 2014). Rather than excluding evidence that is allegedly hearsay, confusing, misleading, untimely, and/or irrelevant, we simply do not rely on it or give it little or no probative weight.

V. CONCLUSION[16]

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
7, 8	103(a)	Pornoy, Cannady, Barbara	7, 8	
10, 11	103(a)	Pornoy, Cannady, Barbara, AAPA	10, 11	
Overall Outcome			7, 8, 10, 11	

VI. ORDER

For the reasons given, it is:

ORDERED that Petitioner has established based on a preponderance of evidence that claims 7, 8, 10, and 11 of U.S. Patent 7,260,846 B2 are *unpatentable* as set forth above;

FURTHER ORDERED that Petitioner's Motion to Exclude is *dismissed*; and

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

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

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