

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SANDVINE CORPORATION and SANDVINE INCORPORATED ULC,
Petitioner,

v.

PACKET INTELLIGENCE, LLC,
Patent Owner.

Case IPR2017-00769
Patent 6,651,099 B1

Before ELENI MANTIS MERCADER, JUSTIN T. ARBES, and
WILLIAM M. FINK, *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner filed a Petition for *inter partes* review of claims 1–10 of U.S. Patent No. 6,651,099 B1 (Ex. 1003, “the ’099 patent”). Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). By statute, institution of an *inter partes* review may not be authorized “unless . . . the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a); *see also* 37 C.F.R. § 42.108.

Upon consideration of the Petition and the Preliminary Response, we are not persuaded Petitioner demonstrated a reasonable likelihood of prevailing in establishing unpatentability of at least one claim of the ’099 patent. Accordingly, we do not institute an *inter partes* review.

A. Related Matters

Patent Owner submits that the ’099 patent is the subject of a patent infringement lawsuit in the United States District Court for the Eastern District of Texas: (1) *Packet Intelligence, LLC v. Sandvine Corp.*, Case No. 2:16-cv-00147, which was consolidated for pretrial matters (except venue) with co-pending *Packet Intelligence, LLC v. NetScout Systems, Inc.*, Case No. 2:16-cv-00230. Paper 5. Petitioner also filed petitions for *inter partes* review of United States Patent Nos. 6,839,751 B1 (IPR2017-00451); 6,771,646 B1 (IPR2017-00450); 6,954,789 B2 (IPR2017-00629 and IPR2017-00630); and 6,665,725 B1 (IPR2017-00862 and IPR2017-00863). *Id.*

B. The '099 Patent

The '099 patent relates to examining packets passing through a connection point on a computer network to determine whether a packet is of an existing conversational flow. Ex. 1003, Abstract. Figure 3 of the '099 patent is reproduced below.

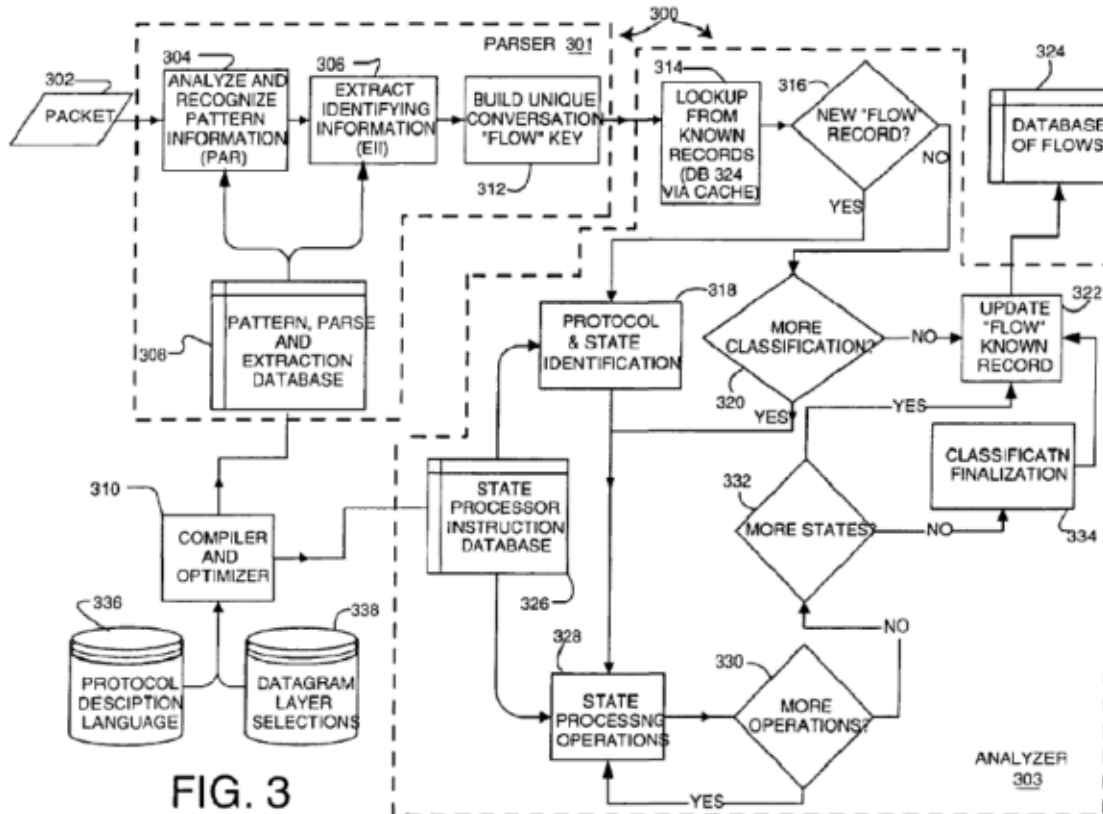


Figure 3 above shows network packet monitor 300. *Id.* at 11:43–45.

Parser 301 parses and extracts selected portions of packet 302 to generate an identifying signature and analyzer 303 analyzes the packet. *See id.* at 11:59–65. Compiler 310 provides protocol specific information to parser 301 and analyzer 303. *Id.* at 11:66–12:1. For each protocol there are several fields that are known, such as the destination (recipient) and the source (sender). *Id.* at 12:5–8. These are used by monitor 300 to identify

the flow. *Id.* Parser 301 uses pattern recognition process 304 carried out by the pattern analysis and recognition (PAR) engine to parse packet 302 and determine the protocol types and associated headers for each protocol layer that exists in packet 302 by using parsing-pattern-structures supplied from parsing/extraction database 308. *Id.* at 12:12–22, 12:65–13:2.

Extraction process 306, implemented by an extracting and information identifying (EII) engine in parser 301, extracts characteristic portions (signature information) from packet 302 using extraction masks supplied from the extraction-operations database (e.g., parsing/extraction database 308) to identify information from the packet. *Id.* at 12:12–22, 13:14–25. This is required to recognize the packet as part of a flow. *Id.* at 13:14–25. The extracted information is put in a sequence that is processed in block 312 to build a unique flow signature (also called a “key”) for the flow depending on the protocols used in the packet. *Id.* The flow signature depends on the protocols used in the packet and may include source and destination addresses. *Id.* at 13:23–29. Building a hash of the signature using a hash function allows for efficient searching. *Id.* at 13:30–36.

A parser record that includes the signature, the hash, and the packet itself, is passed on to lookup process 314 carried out by the lookup engine (LUE) to determine whether the particular packet belongs to a known flow as indicated by the presence of a flow-entry matching the flow in a database of known flows 324. *Id.* at 13:54–61, 14:3–13.

Flow-entry database 324 “stores flow-entries that include the unique flow-signature, state information, extracted information from the packet for updating flows,” and statistics about the flow. *Id.* at 14:14–18. If there is no flow-entry matching the signature (e.g., the signature is for a new flow), then

protocol and state identification process 318 determines the state and protocol. *Id.* at 14:39–42. Process 318 determines the protocols and where in the state sequence for the protocol the packet belongs by making reference to database 326 of state patterns and processes. *Id.* at 14:41–46. If the packet is found to have matching flow-entry in database 324 (e.g., in the cache) then process 320 determines, from the looked-up flow entry, if more classification by state processing of the flow signature is necessary. *Id.* at 14:49–53. If no further processing is needed, then process 322 updates the flow entry in flow-entry database 324. *Id.* at 14:53–54. If state processing is required, then state processor 328 carries out any state operations according to state instructions from state pattern and processes database 326. *Id.* at 14:58–62.

State processor 328 analyzes both new and existing flows in order to analyze all levels of the protocol stack, ultimately classifying flows by application (level 7 in the ISO model). *Id.* at 14:63–66. This is done by processing from state-to-state based on predefined state transition rules and state operations specified in state processor instruction database 326. *Id.* at 14:66–15:1. By maintaining a state of flows, network traffic monitor 300 provides for a single packet protocol recognition of flows and multiple-packet recognition of flows. *Id.* at 15:18–22. Process 334 finalizes the classification of the conversational flow. *Id.* at 15:39–41.

C. Illustrative Claim

Claim 1 of the challenged claims of the '099 patent is independent.
Claim 1 is illustrative of the claimed subject matter:

1. A packet monitor for examining packets passing through a connection point on a computer network in real-time, the packets provided to the packet monitor via a packet

acquisition device connected to the connection point, the packet monitor comprising:

(a) a packet-buffer memory configured to accept a packet from the packet acquisition device;

(b) a parsing/extraction operations memory configured to store a database of parsing/extraction operations that includes information describing how to determine at least one of the protocols used in a packet from data in the packet;

(c) a parser subsystem coupled to the packet buffer and to the pattern/extraction operations memory, the parser subsystem configured to examine the packet accepted by the buffer, extract selected portions of the accepted packet, and form a function of the selected portions sufficient to identify that the accepted packet is part of a conversational flow-sequence;

(d) a memory storing a flow-entry database including a plurality of flow-entries for conversational flows encountered by the monitor;

(e) a lookup engine connected to the parser subsystem and to the flow-entry database, and configured to determine using at least some of the selected portions of the accepted packet if there is an entry in the flow-entry database for the conversational flow sequence of the accepted packet;

(f) a state patterns/operations memory configured to store a set of predefined state transition patterns and state operations such that traversing a particular transition pattern as a result of a particular conversational flow-sequence of packets indicates that the particular conversational flow-sequence is associated with the operation of a particular application program, visiting each state in a traversal including carrying out none or more predefined state operations;

(g) a protocol/state identification mechanism coupled to the state patterns/operations memory and to the lookup engine, the protocol/state identification engine configured to determine the protocol and state of the conversational flow of the packet; and

(h) a state processor coupled to the flow-entry database, the protocol/state identification engine, and to the state patterns/operations memory, the state processor, configured to carry out any state operations specified in the state patterns/operations memory for the protocol and state of the flow of the packet,

the carrying out of the state operations furthering the process of identifying which application program is associated with the conversational flow-sequence of the packet, the state processor progressing through a series of states and state operations until there are no more state operations to perform for the accepted packet, in which case the state processor updates the flow-entry, or until a final state is reached that indicates that no more analysis of the flow is required, in which case the result of the analysis is announced.

Ex. 1003, 35:2–62.

D. References

Petitioner relies on the following references. Pet. 1–2.

Reference	Title	Date	Ex. No.
Engel	US 6,115,393	Sep. 5, 2000 (filed June 21, 1995)	Ex. 1007
Graham-Cumming	US 6,182,146 B1	Jan. 30, 2001 (filed June 27, 1997)	Ex. 1010
Baker	US 5,793,954	Aug. 11, 1998	Ex. 1012
Phelps	US 4,532,606	July 30, 1985	Ex. 1034

E. Asserted Grounds of Unpatentability

Petitioner contends that claims 1–10 of the '099 patent are unpatentable based on the following grounds:

References	Basis	Challenged Claims
Engel, Baker, and Graham-Cumming	§ 103(a)	1–5, 9, and 10
Engel, Baker, Graham-Cumming, and Phelps	§ 103(a)	6–8

Pet. 1–2. Petitioner also relies on the declaration of Bill Lin, Ph.D. (Ex. 1006) for support. *Id.* at 2.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their “broadest reasonable construction in light of the specification of the patent in which they appear.” 37 C.F.R. § 42.100(b). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner provides proposed constructions of the claim terms “conversational flow,” “state of the flow,” and “state operations” (in claims 1–10). Pet. 2–8. Patent Owner provides proposed constructions of the same claim terms. Prelim. Resp. 22–29. Other than the term “conversational flow,” discussed below, we determine that no claim term requires express construction to resolve the issues before us.

Petitioner contends that the broadest reasonable interpretation of the term “conversational flow,” in view of the intrinsic record, is “the sequence

of packets that are exchanged in any direction as a result of an activity,” where a “conversational flow” is distinguished from a “connection flow” in that some of the conversational flows “involve more than one connection” or “involve more than one exchange of packets between a client and server.” Pet. 3–4 (citing Ex. 1003, 2:34–45). Petitioner acknowledges that the claimed systems and methods “*require more than identifying and classifying* ‘only connection flows,’ as repeatedly stated throughout the intrinsic record.” *Id.* at 3 (emphasis added).

Patent Owner contends the term “conversational flow” is expressly defined in the ’099 patent as

the sequence of packets that are exchanged in any direction as a result of an activity—for instance, the running of an application on a server as requested by a client—and where some conversational flows involve more than one connection, and some even involve more than one exchange of packets between a client and server.

Prelim. Resp. 11–12 (citing Ex. 1003, 2:34–45), 24 (citing Ex. 2001 ¶¶ 26–31).

Patent Owner notes one aspect that “distinguishes this invention from prior art network monitors is that it has the ability to recognize disjointed flows as belonging to the same conversational flow.” *Id.* at 12 (citing Ex. 1003, 3:48–51). According to Patent Owner, conversational flows are established, in part, by the invention’s “capabil[ity] of examining up to whatever level is sufficient to uniquely identify to a required level, even all of the way to the application level (in the [Open Systems Interconnection (OSI)] model).” *Id.* at 12; Ex. 1003, 4:13–16.

In the first place, we observe that both parties agree that “conversational flow” is defined as “the sequence of packets that are exchanged in any direction as a result of an activity” and that “conversational flow” is distinguished from the prior art “connection flow” in that some conversational flows “involve more than one connection, and some even involve more than one exchange of packets between a client and server.” Furthermore, we observe that the specification of the ’099 patent explicitly supports this construction. *See* Ex. 1003, 2:34–45. Accordingly, for purposes of this Decision, we agree that Patent Owner’s proposed construction, which mirrors the definition in the specification, is the broadest reasonable construction consistent with the specification. Therefore, we interpret “conversational flow” to mean the sequence of packets that are exchanged in any direction as a result of an activity (for instance, the running of an application on a server as requested by a client), where some conversational flows involve more than one connection, and some even involve more than one exchange of packets between a client and server.¹

*B. Asserted Obviousness Over Engel, Baker and Graham-Cumming:
Claims 1–5, 9, and 10*

1. Engel (Ex. 1007)

Engel is directed to monitoring communications “in a network of nodes, each communication being effected by a transmission of one or more packets among two or more communicating nodes, and each communication complying with a predefined communication protocol selected from among

¹ We also agree with the parties that “conversational-flow sequence” in the claims is used interchangeably with “conversational flow,” and means the same. *See* Pet. 3; Prelim. Resp. 22–24.

protocols available in the network.” Ex. 1007, Abstract. “The contents of packets are detected passively and in real time, [and] communication information associated with multiple protocols is derived from the packet contents.” *Id.* Such communication information “is associated with multiple layers of at least one of the protocols.” *Id.* at 2:27–30. Network monitor 10 captures and analyzes all packets in a segment and extracts all items of interest from the frames. *Id.* at 6:58–61. A Real Time Parser (RTP) performs protocol parsing with appropriate parsing routines. *Id.* at 19:53–67, 21:15–30.

Figure 4 of Engel is reproduced below.

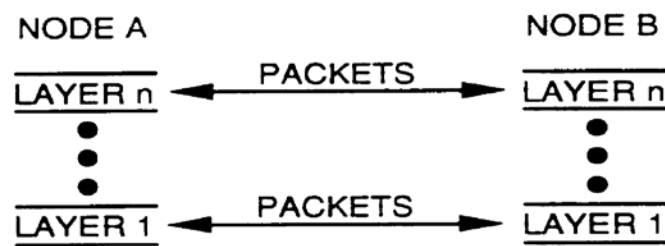


FIG 4

Figure 4 “illustrates the different layers of a communication between two nodes.” *Id.* at 4:45–46. In Figure 4, “Nodes A and B are exchanging packets and are engaged in multiple dialogs.” *Id.* at 9:31–33. A dialog is a communication at any layer between a sender and a receiver, which is composed of one or more packets being transmitted between them and often involves exchanges in both directions. *Id.* at 9:19–27. Layer 1 in Node A has a dialog with Layer 1 in Node B. *Id.* at 9:33–34. This is a data link layer and the nature of the dialog deals with the message length, number of

messages, errors, and the guarantee of the delivery. *Id.* at 9:34–37.

Simultaneously, Layer n of Node A is having a dialog with Layer n of node B. *Id.* at 9:37–39. This is an application layer dialog, which deals with virtual terminal connections and response rates. *Id.* at 9:39–41. All of the other layers (2 through n-1) are also having simultaneous dialogs. *Id.* at 9:41–43.

A dialog record is kept which contains the addresses of both ends of the dialog concatenated together to form a single address wherein the first and second addresses within the single address are designated as nodes 1 and 2, respectively. *Id.* at 18:63–19:2.

2. Baker (Ex. 1012)

Figure 1 of Baker is reproduced below.

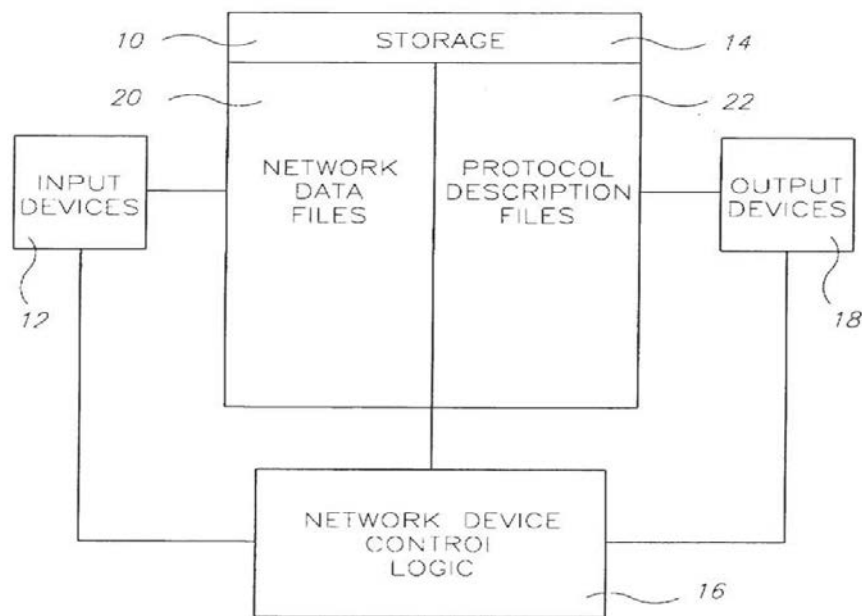


Figure 1 shows database of protocol description files 22 used by network device control logic 16 to retrieve network frames based on extracted field values and filtering criteria contained in protocol description files 22. Ex. 1012, 5:56–67.

Baker's protocol description file includes a protocol control record that defines the overall structure of a network protocol and references other information relating to the network protocol. *Id.* at 7:9–15. Each protocol description file includes a total bit length of the protocol header, a number of fields required to describe the header, and field records, each describing a protocol header field, including a byte offset from the start of the protocol header and, if appropriate, an associated lookup structure for determining the next protocol control record to use. *Id.* at 7:9–12:3, Tables 1 and 2.

Upon initialization of the system, the protocol and associated control record information is extracted from all protocol description files and a "ProtocolList" is constructed. *Id.* at 12:7–15. The ProtocolList is a sorted vector of all protocol records. *Id.* Each protocol description control record and all associated records are shown in Tables 1–11 as they appear when resident in memory. *Id.* at 11:18–25.

3. *Graham-Cumming (Ex. 1010)*

Figure 3 of Graham-Cumming is reproduced below.

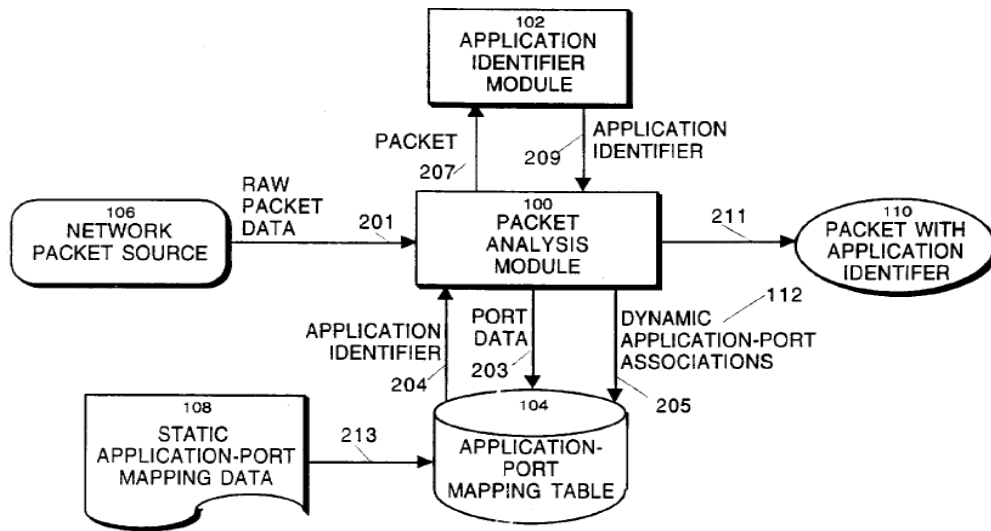


FIG. 3

Figure 3 shows a functional model of identifying applications and network protocols from raw packet data. Ex. 1010, 5:14–16. Figure 3 includes packet analysis module 100, application identifier module 102, and application-port mapping table 104. *Id.* at 5:16–19. “[A]pplication-port mapping table 104 stores associations between application identifiers and port numbers.” *Id.* at 5:23–24. “[A]pplication identifier module 102 attempts to match portions of the packet data, including the payload or header, with defined patterns or attributes for each of a plurality of different applications.” *Id.* at 6:22–25. “Each application may have one or more such sequences which uniquely identifies it.” *Id.* at 6:29–31.

4. Level of Ordinary Skill in the Art

Section 103(a) forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.”

KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007) (quoting 35 U.S.C.

§ 103(a)). Petitioner argues that a person of ordinary skill in the art at the time of the '099 patent would have had

at least a bachelor's degree, or equivalent, in electrical engineering, computer engineering, computer science, or a related field or an equivalent number of years of working experience, and one to two years of experience in networking environments, including at least some experience with network traffic monitors, analyzers, and/or firewalls or other intrusion detection systems.

Pet. 2 (citing Ex. 1006 ¶¶ 20–22). Patent Owner argues that a person of ordinary skill in the art would have had “the equivalent of a four-year degree from an accredited institution (usually denoted as a B.S. degree) in computer science, computer engineering or the equivalent and experience with, or exposure to, packet analysis techniques,” as well as “approximately 1–2 years of professional experience with packet network communication protocols.” Prelim. Resp. 22 (citing Ex. 2001 ¶ 24). The parties' proposed definitions are very similar. For example, experience with “network traffic monitors [and] analyzers” in “networking environments” (Petitioner's proposed definition) likely would include experience with “packet network communication protocols” and “packet analysis techniques” (Patent Owner's proposed definition). Based on this record, including our review of the '099 patent and the types of problems and solutions described in the '099 patent and cited prior art, we conclude that a person of ordinary skill in the art would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field (or its equivalent), and one to two years of experience working in networking environments, including at least some experience with network traffic

monitors and/or analyzers.² We apply this level of ordinary skill in the art for purposes of this Decision.

5. Analysis of Claim 1

Petitioner relies on Engel as allegedly teaching the majority of the limitations of independent claim 1, and relies on Baker and Graham-Cumming for certain limitations. Pet. 11–52. Claim 1 requires, *inter alia*, a “parser subsystem configured to examine the packet accepted by the buffer, extract selected portions of the accepted packet, and form a function of the selected portions sufficient *to identify that the accepted packet is part of a conversational flow-sequence*,” “the carrying out of the state operations furthering the process of *identifying which application program is associated with the conversational flow-sequence* of the packet,” and “a memory storing a flow-entry database including a plurality of flow-entries for *conversational flows* encountered by the monitor” (emphasis added).

Petitioner argues that two different aspects of Engel constitute “conversational flows”: “Application Level Dialogs” and “Application-Specific Server Statistics.” Pet. 18–19. At the outset, we note that Petitioner’s arguments are premised on its position that related U.S. Patent No. 6,839,751 B1 (Ex. 1002, “the ’751 patent”) “provides conversational flow examples where flows are determined and metrics reported ‘for a given application *and either* a specific Client-Server Pair *or* a

² We do not include in the definition experience with “firewalls or other intrusion detection systems,” as Petitioner proposes, because the relevant art is network monitoring and analysis. See, *e.g.*, Ex. 1003, 1:40–43.

specific Server and all of its clients.’”³ Pet. 18 (quoting Ex. 1002, 34:58–60). As Patent Owner points out, however, the cited portion of the ’751 patent relates to tracking various statistics and does not mention conversational flows. See Prelim. Resp. 46–47; see Ex. 1002, 31:52–49:60 (describing “how the monitor of the invention can be used to monitor the Quality of Service (QOS) by providing QOS Metrics”). The specific language quoted by Petitioner pertains to one such metric, “CSTraffic,” which “contains information about the volume of traffic measured for a given application and either a specific Client-Server Pair or a specific Server and all of its clients.” Ex. 1002, 34:55–60. However, we do not see how this language supports Petitioner’s position. Monitoring statistics is not the same as monitoring a conversational flow, which necessarily identifies a “sequence of packets,” under our interpretation. See *supra* Section II.A. In other words, tracking statistics for a given application between a particular client and server, or between a particular server and all of its clients, is not sufficient in and of itself; a conversational flow identifies a sequence of packets exchanged between two nodes as a result of specific activity (e.g., a “sequence of packets that are exchanged in any direction as a result of an activity”).

We now turn to Petitioner’s two arguments as to how Engel allegedly

³ The ’099 patent states that the application that issued as the ’751 patent is incorporated by reference. Ex. 1003, 1:21–27. Also, the ’099 and ’751 patents were filed on the same date (June 30, 2000) and both claim the benefit of U.S. Provisional Patent Application No. 60/141,903. The ’099 and ’751 patents have some of the same disclosure in their written descriptions.

teaches conversational flows. First, Petitioner contends that Engel teaches “Application Level Dialogs.” Pet. 19–22. Petitioner argues that Engel “considers the nature of the communication (e.g., the application program being invoked) in addition to the Client-Server Pair involved in the communication in identifying an application level dialog, rendering such dialog a conversational flow within the meaning of the ‘099 Patent.” *Id.* at 19 (citing Ex. 1007, 9:27–10:3). Petitioner relies on Engel’s definition of “dialog” as “the exchange of messages and the associated meaning and state that is inherent in any particular exchange at any layer.” *Id.* at 19–20 (citing Ex. 1007, 9:25–27). According to Petitioner, Engel discloses “creating and maintaining dialogs” and associated statistics at different layers. *Id.* at 20 (citing Ex. 1007, 9:27–10:3). In particular, Petitioner asserts that the dialog at the application level “is an exchange of one or more packets in any direction between two nodes as a result of an activity (e.g., [a Network File System (NFS)] mount request).” *Id.* (citing Ex. 1007, 9:58–10:3). Petitioner concludes that tracking an application-level dialog constitutes tracking a conversational flow. *Id.*

Petitioner further relies on Dr. Lin’s testimony to assert that, to the extent that conversational flows require the tracking of multiple connections, “Engel’s application level lookup_dialog routines search for existing dialogs based on application and the client-server IP address pair of the communication.” Pet. 21 (citing Ex. 1006 ¶ 89). Petitioner further contends, based on Dr. Lin’s testimony, that “Engel’s deallocation routines deallocate dialog records when the period of inactivity for a dialog address pair (measured from the last time an application-specific packet (e.g., NFS) between the IP address pair of the dialog was seen) has exceeded a defined

application-specific threshold.” *Id.* (citing Ex. 1007, 17:2–16; Ex. 1006 ¶¶ 109–110).

Patent Owner responds that Engel’s dialogs are different from conversational flows because they are merely “collections of statistics for each OSI layer across packets (regardless of application origin)” and do not relate packets that are the result of an application activity. Prelim. Resp. 45–46 (citing Ex. 1007, 4:23–32; Ex. 2001 ¶¶ 78–79). For example, noting Petitioner’s statement that “[e]ach application level dialog tracks all application activity between the client-server pair occurring on any connections until the dialog data structures are deallocated for reuse,” Patent Owner contends that relating all application activity between a client and server is insufficient because a conversational flow requires relating flows for specific application activities. *Id.* at 49–50 (citing Ex. 2001 ¶¶ 80–81). We agree with Patent Owner.

Engel explains that a “dialog” is
a concept which provides a useful way of conceptualizing, organizing and displaying information about the performance of a network—for any protocol and for *any layer* of the multi-level protocol stack.

As noted above, the basic unit of information in communication is a packet. A packet conveys meaning between the sender and the receiver and is part of a larger framework of packet exchanges. The larger exchange is called a dialog within the context of this document. That is, a dialog is a communication between a sender and a receiver, which is composed of one or more packets being transmitted between the two. There can be multiple senders and receivers which can change roles. In fact, most dialogs involve exchanges in both directions.

Stated another way, a dialog is the exchange of messages and the associated meaning and state that is inherent in any

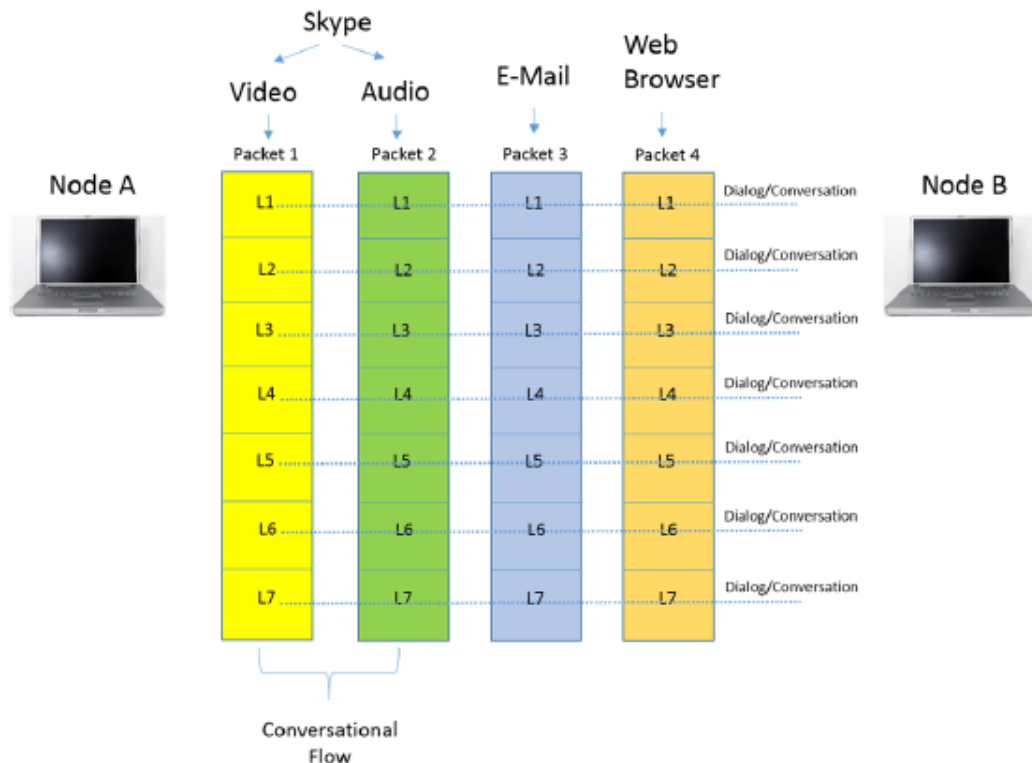
particular exchange at *any layer*. It refers to the exchange between the peer entities (hardware or software) in any communication. In those situations where there is a layering of protocols, any particular message exchange could be viewed as belonging to multiple dialogs. For example, in FIG. 4 Nodes A and B are exchanging packets and are engaged in multiple dialogs. Layer 1 in Node A has a dialog with Layer 1 in Node B. For this example, one could state that this is the data link layer and the nature of the dialog deals with the message length, number of messages, errors and perhaps the guarantee of the delivery. Simultaneously, Layer n of Node A is having a dialog with Layer n of node B. For the sake of the example, one could state that this is *an application layer dialog which deals with virtual terminal connections and response rates*. One can also assume that all of the other layers (2 through n-1) are also having simultaneous dialogs.

Ex. 1007, 9:9–43 (emphases added).

As shown in Figure 4 (reproduced *supra* Section II.B.1), Nodes A and B engage in a dialog at each layer (e.g., the application layer). Thus, Engel monitors communications exchanged between the nodes at a particular layer, and tracks statistics for all communications at that layer (to assist in diagnosing network problems and improving network performance). *See, e.g., id.* at 4:24–32 (Engel “organizes and presents network performance statistics in terms of dialogs which are occurring at any desired level of the communication”). Petitioner, however, does not point to any disclosure in Engel indicating that its disclosed system relates information from one packet to another as pertaining to a specific application activity. In other words, in Engel there is exchange of packets in the application layer constituting a dialog (*see, e.g., id.* at 9:39–43) and collection of respective statistics for that dialog (*see, e.g., id.* at 4:24–32). However, even if application activity causes the dialog to be created, Petitioner does not direct

us to teachings or disclosure of identifying a sequence of packets as being part of a specific application activity. Moreover, Patent Owner notes that in Engel “[k]eeping statistics for protocol layers may be temporarily suspended when parsing and statistics gathering is not rapid enough to match the rate of packets to be parsed,” which further suggests Engel does not relate sequences of packets to applications because some packets may be lost. Prelim. Resp. 36 (quoting Ex. 1007, 3:12–14; Ex. 2001 ¶ 74).

Patent Owner provides the following illustration on page 41 of its Preliminary Response:



The Figure above depicts four packets exchanged between Nodes A and B, with each row representing a layer of the OSI model. Engel treats each layer separately. For example, packets 1 and 2 may both result from the same application (e.g., video and audio traffic using Skype), but Engel would not link them as being part of a single conversational flow. See *id.* at

41–42, 49–50 (“Engel is not concerned with which application a specific packet originated from or which packets relate to one another based on the application that generated them.”). Patent Owner’s explanation is consistent with the disclosure of Engel and is supported by the testimony of its declarant, Kevin C. Almeroth, Ph.D. *See, e.g.*, Ex. 1007, 9:9–43 (“a dialog is a communication between a sender and a receiver, which is composed of one or more packets being transmitted between the two,” where, for example, “Layer n of Node A is having a dialog with Layer n of node B”); 9:67–10:3 (“If in fact there exists more than one communication thread between Nodes A and B, then these would represent separate, different dialogs.”); Ex. 2001 ¶¶ 66–85.

Petitioner’s position appears to be that conversational flows exist in Engel simply because communications exist at the application layer and because those communications result from some application activity. *See* Pet. 19–22. As explained in connection with Patent Owner’s illustration above, however, we do not see—and Petitioner does not point to—anything in Engel indicating that it links communications by application (as opposed to by layer and client-server pair) as the construction of “conversational flows” above requires. *See supra* Section II.A; Ex. 1003, 3:48–51 (“What distinguishes this invention from prior art network monitors is that it has the ability to recognize disjointed flows as belonging to the same conversational flow.”). Petitioner argues that “Engel’s application level lookup_dialog routines search for existing dialogs *based on application and the client-server IP address pair* of the communication,” citing Dr. Lin’s testimony as support, but Dr. Lin only explains how Engel searches for existing dialogs

based on the client-server IP address pair, not based on application.⁴ See Pet. 21 (emphasis added); Ex. 1006 ¶ 89. Indeed, Petitioner acknowledges that Engel’s application level dialogs track “*all* application activity between the client-server pair,” without pointing to any specific disclosure in Engel of tracking activity by application. See Pet. 21 (emphasis added). Nor are we persuaded by Petitioner’s argument regarding deallocation. See *id.* at 21–22. Engel deallocates dialog records after a period of inactivity “for a dialog address pair,” which does not support Petitioner’s contention that Engel links communications by application (as opposed to simply by layer and client-server pair). See *id.* (citing Ex. 1007, 17:2–16); Prelim. Resp. 50–51.

Second, Petitioner argues that Engel teaches “Application-Specific Server Statistics.” Pet. 23–25. According to Petitioner, “Engel recognizes disjointed flows as belonging to the same conversational flow by tracking statistics for a given application and a specific Server and its clients.” *Id.* at 23. Petitioner argues that Engel discloses tracking application-specific server statistics wherein

⁴ We also note that Dr. Lin explains in his declaration how Engel’s disclosed system works, but does not opine that the reference teaches “conversational flows” or explain how any of the limitations of the claims are taught by Engel. See Ex. 1006 ¶¶ 51–157 (Dr. Lin stating that he “was asked to review Engel and the source code found in Engel’s Appendix VI and to provide an overview of the operation of the Engel packet monitor as disclosed in the Engel patent and the Appendix VI source code”). Thus, we determine that Dr. Almeroth’s testimony that Engel does *not* teach “conversational flows” does not create a genuine issue of material fact (which would be viewed in the light most favorable to Petitioner pursuant to 37 C.F.R. § 42.108(c)).

[e]ach application-specific server record includes a dialog link queue with a linked list of all application dialogs in which the server has participated (i.e., dialogs for a given application and a specific Server and all of its clients), and therefore recognizes and links disjointed exchanges associated with a particular application, even if the clients were not the same. . . . Accordingly, Engel discloses recognizing flows for a given application and a specific Server and all of its clients and therefore recognizes and links disjointed flows as belonging to the same conversational flow within the meaning of the '099 Patent.

Pet. 24–25 (citing Ex. 1007, Fig. 7B (item 160), 18:41–62, 17:32–18:40; Ex. 1009, 179, 247–48; Ex. 1006 ¶¶ 63, 65).

As explained above, however, Petitioner has only shown that Engel links packets (and tracks corresponding statistics) by layer and client-server pair, not by application. Thus, we are not persuaded that Engel links communications “associated with a particular application” as Petitioner contends. *See id.* We agree with Patent Owner and Dr. Almeroth that

[b]ecause Engel considers dialogs unique and does not relate subsequent packets with previously seen packets, Engel is user-agnostic—no effort is made to relate packets to specific application activities. Rather, all packet dialogs at a given OSI level are treated uniformly and are indistinct from one another; any context of who sent the packets or for what purpose is lost under Engel. In essence, each dialog is placed into a single bucket and Engel does not recognize or establish relationships among the dialogs.

Prelim. Resp. 51–52 (citations omitted); *see* Ex. 2001 ¶ 83.

Engel discloses that in a connection oriented protocol, once a connection is established, Nodes A and B may have simultaneous *unique* dialogs. Ex. 1007, 9:51–57, Fig. 4. Engel further discloses that in a connectionless protocol, once the communication has begun, it is possible to

determine the action requested. *Id.* at 9:58–67. However, if there are multiple communication threads between Nodes A and B, they would be *separate and different* dialogs. *Id.* at 10:1–3. We see no disclosure in Engel of linking these disjointed dialogs into a “conversational flow.” Petitioner’s cited portions of Engel shed no light on such connections. *See* Pet. 24 (citing Ex. 1007, 18:41–62, 17:32–18:40). Keeping statistics relating to separate dialogs does not extend to linking unique dialogs, let alone linking them based on a specific application.

For the reasons set forth above, we are not persuaded that Engel teaches the “conversational flow” limitations recited in claim 1, namely a “parser subsystem configured to examine the packet accepted by the buffer, extract selected portions of the accepted packet, and form a function of the selected portions sufficient to identify that the accepted packet is part of a conversational flow-sequence,” “the carrying out of the state operations furthering the process of identifying which application program is associated with the conversational flow-sequence of the packet,” and “a memory storing a flow-entry database including a plurality of flow-entries for conversational flows encountered by the monitor.” Thus, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that independent claim 1, as well as claims 2–5, 9, and 10, which depend from claim 1, are unpatentable over the combination of Engel, Baker, and Graham-Cumming.

C. Asserted Obviousness Over Engel, Baker, Graham-Cumming, and Phelps: Claims 6–8

Claims 6–8 depend, directly or indirectly, from claim 1. Petitioner does not rely on the additional cited reference, Phelps, as allegedly teaching “conversational flows” as recited in claim 1. Pet. 67–72. Thus, for the

reasons set forth above, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that claims 6–8 are unpatentable over the combination of Engel, Baker, Graham-Cumming, and Phelps. *See supra* Section II.B.

III. CONCLUSION

We conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the '099 patent challenged in the Petition. Therefore, we do not institute an *inter partes* review on the asserted grounds as to any of the challenged claims.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied as to all challenged claims of the '099 patent.

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