

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TALARI NETWORKS, INC.,
Petitioner,

v.

FATPIPE NETWORKS INDIA LIMITED,
Patent Owner.

Case IPR2016-00976
Patent 6,775,235 B2

Before STACEY G. WHITE, MICHELLE N. WORMMEESTER, and
CHRISTA P. ZADO, *Administrative Patent Judges*.

WHITE, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Talari Networks, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) seeking to institute an *inter partes* review of claims 4, 5, 7–15, and 19 of U.S. Patent No. 6,775,235 B2 (Ex. 1001, “the ’235 patent”) pursuant to 35 U.S.C. §§ 311–319. FatPipe Networks India Limited. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Based on our review of these submissions, we instituted *inter partes* review of claims 4, 5, 7–15, and 19 on the following specific grounds:

Reference(s)	Basis	Claims Challenged
Karol ¹	§ 102	4, 5, 7–11, 14, and 19
Karol	§ 103	4, 5, 7–15, and 19
Karol and Stallings ²	§ 103	5, 11–15, and 19

Paper 7 (“Dec.”), 22. Patent Owner filed a Patent Owner’s Response (Paper 22, “PO Resp.”), and Petitioner filed a Reply (Paper 26, “Reply”). An oral hearing was held on August 14, 2017. Paper 31 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. 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, Petitioner has demonstrated by a preponderance of the evidence that claims 4, 5, and 7–15 of the ’235 patent are unpatentable. Petitioner has not meet its burden to establish the unpatentability of claim 19.

¹ U.S. Patent No. 6,628,617 B1 (“Karol,” Ex. 1006).

² William Stallings, *Data and Computer Communications*, Prentice-Hall, 5th Ed, 1997, ISBN-81-203-1240-6 (“Stallings,” Ex. 1011).

B. Related Proceedings

The parties inform us that *FatPipe, Inc. v. Talari Networks, Inc.*, No. 5:16-CV-54-BO (E.D.N.C.) and *FatPipe, Inc. v. Viptela, Inc.*, No. DED-1-16-cv-00182 (D. Del.), may be impacted by this proceeding. Pet. 1; Paper 30, 2–3. In addition, Petitioner has a pending petition for *inter partes* review of a related patent, U.S. Patent No. 7,406,048 B2 (“the ’048 patent”) (IPR2016-00977). Pet. 2. Viptela, Inc. and Cisco Systems, Inc. also have filed petitions seeking *inter partes* review of various claims of the ’235 and ’048 patents. Paper 30, 3.

C. The ’235 Patent

The ’235 patent describes a system and method for communicating using two or more disparate networks in parallel. Ex. 1001, Abstract. For example, an embodiment of this system could be composed of a virtual private network (“VPN”) in parallel with a frame relay network. *Id.* at 1:19–24. These parallel networks back each other up in case of failure and when both networks are operational their loads are balanced between the parallel networks. *Id.* at Abstract. An embodiment of this system is depicted in Figure 10, which is shown below.

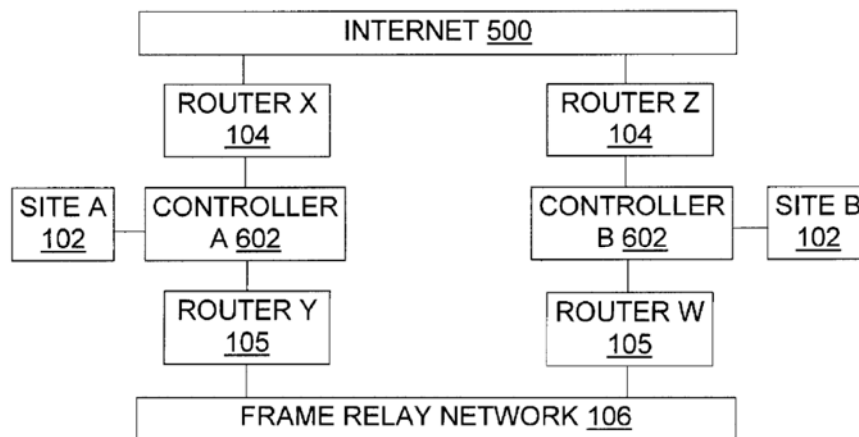


Fig. 10

Figure 10 depicts an example of the network topology described in the '235 patent. *Id.* at 8:29–30. Two sites 102 transmit and/or receive data from one another. *Id.* at 2:38–40. These sites are connected by two disparate networks, Internet 500 and frame relay network 106. *Id.* at 8:30–32. Each location has frame relay router 105 and Internet router 104. *Id.* at 8:32–33. “Access to the disparate networks at site A and site B is through an inventive controller 602 at each site.” *Id.* at 6:34–36. Controller 602 “allows load-balancing, redundancy, or other criteria to be used dynamically, on a granularity as fine as packet-by-packet, to direct packets to an Internet router and/or frame relay/point-to-point router according to the criteria.” *Id.* at 9:12–17.

Figure 7 of the '235 patent is reproduced below.

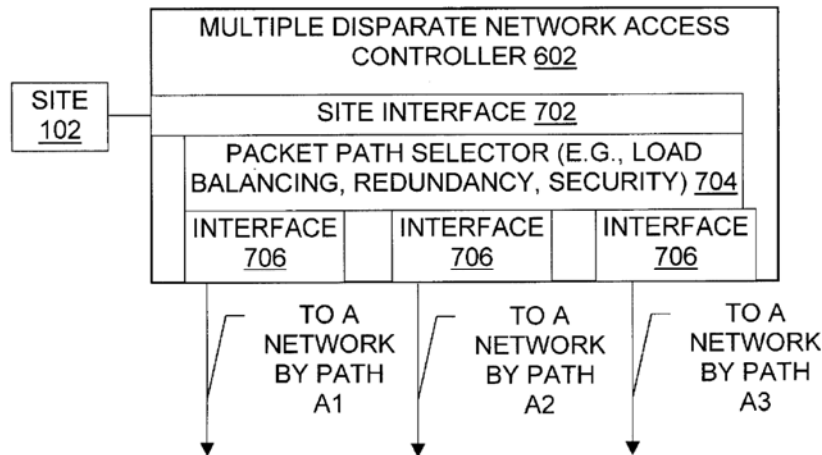


Fig. 7

Figure 7 depicts controller 602. *Id.* at 10:59–60. Controller 602 is connected to site 102 via site interface 702. *Id.* at 10:60–63. Packet path selector 704 is hardware or software that determines which path a given packet is to travel. *Id.* at 11:2–6. The criteria used to determine which path a packet travels may be based on concerns such as redundancy,

load-balancing, or security. *Id.* at 11:9–63. Controller 602 also has two or more network interfaces 706 (at least one per each network for which controller 602 controls access). *Id.* at 11:64–67.

D. Illustrative Claim

As noted above, we instituted review of claims 4, 5, 7–15, and 19 of the '235 patent, of which claims 4, 5, and 19 are independent. Claim 5 is illustrative of the challenged claims and is reproduced below:

5. A method for combining connections for access to multiple parallel disparate networks, the method comprising the steps of:
 - obtaining at least two known location address ranges which have associated networks;
 - obtaining topology information which specifies associated networks that provide, when working, connectivity between a current location and at least one destination location;
 - receiving at the current location a packet which identifies a particular destination location by specifying a destination address for the destination location;
 - determining whether the destination address lies within a known location address range;
 - selecting a network path from among paths to disparate associated networks, said networks being in parallel at the current location, each of said networks specified in the topology information as capable of providing connectivity between the current location and the destination location;
 - forwarding the packet on the selected network path.

II. CLAIM CONSTRUCTION

In an *inter partes* review, “[a] claim in an unexpired patent shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b). Under this standard, we

construe claim terms using “the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997).

A. *“selects between network interfaces on a per-packet basis” (claim 4)*
 /“make network path selections on a packet-by-packet basis” (claim 9)

Patent Owner contends that one of ordinary skill in the art would have understood these phrases to mean “for each packet, make[] a discrete choice between network paths/interfaces.” PO Resp. 9 (citing Ex. 2003 ¶¶ 34–41). Petitioner asserts that if we determine that these phrases need construction the proper construction is “for each packet a network interface/path is chosen.” Reply 6. The parties dispute whether path selections must occur once for each individual packet or whether such selection may be made for a group of packets. PO Resp. 10; Reply 2–3.

First, Patent Owner asks that we construe the select/selections terms to mean making a discrete choice between two or more possibilities. PO Resp. 9. Petitioner asserts that there is no basis for Patent Owner’s proposed “discrete choice” language. Reply 4. We are not persuaded that, for the purposes of this Decision, there is meaningful information to be gleaned by construing the words select/selections to mean “make a choice.” We also are not persuaded that there is a basis for inserting the word “discrete” into this construction. Therefore, based on the disputes before us, we see no reason to provide an express construction for the common terms select/selections.

Patent Owner contends that the terms “per” and “packet-by-packet” would have been understood to require a selection for each packet. PO Resp. 10. Thus, Patent Owner asserts that there must be a path selection process performed for each individual packet. *Id.* Petitioner argues that this is too narrow of a view of the claim terms and asserts that the specification describes making a single selection that applies to each packet in a group. Reply. 2–3.

In support of their arguments both parties direct us to Figure 9 and its supporting text. Figure 9 is reproduced below.

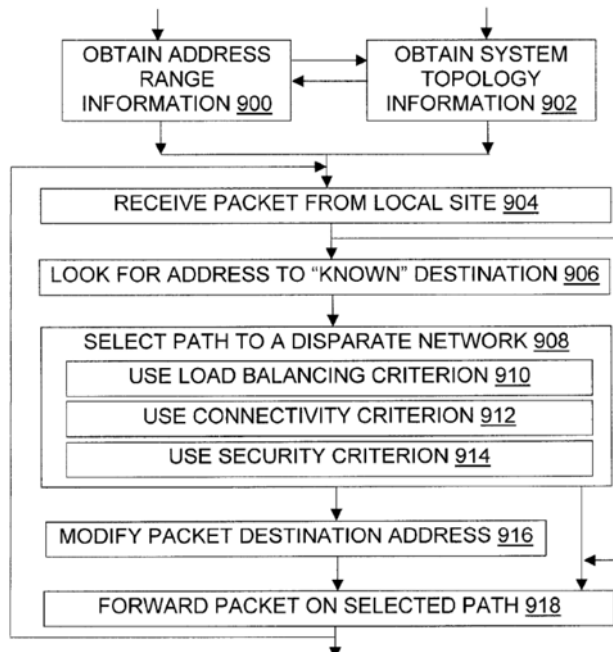


Fig. 9

Figure 9 “is a flowchart illustrating methods of the present invention for combining connections to send traffic over multiple parallel independent disparate networks.” Ex. 1001, 5:48–50. The parties direct us to the discussion of step 908, which states that

[d]uring a path selecting step 908, the path selector 704 selects the path over which the packet will be sent; selection is made between at least two paths, each of which goes over a different

network 106 than the other. The disparate networks are independent parallel networks. This path selecting step 908 may be performed once per packet, or a given selection may pertain to multiple packets.

Id. at 14:40–46.

As described in the specification, Figure 9 depicts “methods” for selecting paths. *See id.* 5:48–50. These methods allow for the selection to “be performed once per packet, *or* a given selection may pertain to multiple packets.” *Id.* at 14:40–46 (emphasis added). Thus, we find that the specification discloses both selection for each individual packet and selection for a group of packets.

Next, we examine the claims to see whether claims 4 and 9 cover both of the embodiments or whether they are directed only to the embodiment wherein the selection occurs for each individual packet. Independent claim 4 recites, in relevant part, “a packet path selector which selects between network interfaces on a per-packet basis.” This stands in contrast to claim 5, which recites, in relevant part, “selecting a network path from among paths to disparate associated networks.” While independent claim 5 refers to “receiving at the current location a packet,” its selection step does not make reference to this “packet,” but rather it recites the selection of a network path without requiring this selection to be made “per-packet.” We are persuaded that this difference is significant in that it evidences that the Patentee intended claim 4 to have a more narrow scope than claim 5.

This distinction is supported by the language of claim 5’s dependent claims. Claim 9 depends from claim 5 and further recites “wherein repeated instances of the selecting step make network path selections on a packet-by-packet basis.” Also, claim 10 depends from claim 5 and further recites

“wherein repeated instances of the selecting step make network path selections on a per session basis.” Thus, claim 9 narrows the breadth of claim 5’s selection step by requiring it to occur “on a packet-by-packet basis” and claim 10 narrows the breadth of claim 5 by requiring selection to occur on a “per session basis.” Therefore, claim 5 is broad enough to encompass selection for more than one packet at a time (a session) and selection for an individual packet.

Petitioner argued that claim 4 must be broad enough to encompass the embodiment in which selections were performed for multiple packets because it would be improper to construe claim 4 in a manner that would exclude that embodiment. Reply 2. We do not agree. The Patentee described multiple embodiments in the specification and as such, the Patentee was free to determine which embodiments would be encompassed by which claims. Here, we are presented with evidence that the Patentee drafted claim 5 to cover both embodiments and drafted dependent claims to focus on the individual embodiments. Such a drafting choice is within the purview of the Patentee and we see no reason why we must construe claim 4 in a manner that would encompass all embodiments. The Patentee’s choice to describe the selection as occurring on a “per packet basis” when viewed in light of the specification and the other claims indicates a decision to direct claim 4 to the embodiment in which routes are selected for each packet. As such, we find that the language of claims 4 and 9 indicates that these claims are directed to the embodiment wherein path selection is performed for each individual packet. Therefore, we construe the disputed phrases to mean “selecting a network path/interface for each packet.”

B. “dynamic load-balancing” (claims 11–13)

Patent Owner asserts that the term “dynamic load-balancing” would have been understood by a person of ordinary skill in the art to mean “distributing packets based on actual traffic assessed after the packet arrives.” PO Resp. 15 (citing Ex. 2003 ¶¶ 42–48). Petitioner responds by arguing that Patent Owner’s proposed construction is overly narrow and that if we determine that a construction is necessary a proper construction would be “sending packets in distributions that balance the load of a given network, router, or connection relative to other networks, routers, or connections available to the controller without manual intervention.” Reply 7 (citing Ex. 1001, 9:30–33, 11:21–24, 11:33–38).

Patent Owner directs us to a passage in the specification that it contends supports its position that the load is balanced in response to actual traffic. PO Resp. 15

For instance, a local area network (LAN) at site 1 may be set up to send all traffic from the accounting and sales departments to router A1 and send all traffic from the engineering department to router B1. This may provide a very rough balance of the traffic load between the routers, but it does *not* attempt to balance router loads dynamically in response to *actual* traffic and thus is *not* “load-balancing” as that term is used herein.

Id. (quoting Ex. 1001, 2:61–65). Patent Owner’s declarant, Joel Williams, explains that

[t]he phrase “as that term is used herein” in this passage informs a [person of ordinary skill in the art] that the ’235 specification imposes constraints on the meaning of the term “load balancing,” relative to the way that term was used conventionally to describe balancing traffic loads between routers. In particular, dynamic load-balancing in the context of the patented invention requires that load-balancing is performed

on the basis of the actual traffic observed at the time of balancing on the available lines.

Ex. 2003 ¶ 43.

Patent Owner asserts that actual traffic is determined at some point in time after the packet arrives. PO Resp. 16. In support of this assertion, Patent Owner directs us to the specification's disclosure that "*in some cases* the path for the next packet *may be determined* by the packet path selector *before* the packet arrives, e.g., in a round-robin manner, *while in other cases* the path is determined *after* the packet arrives, e.g., using per-packet dynamic load balancing." *Id.* (quoting Ex. 1001, col. 14:53–58) (emphases added).

Petitioner disputes this construction and argues that Patent Owner's view of the claim language is "a blatant, improper attempt to read additional limitations into the claims." Reply 7. According to Petitioner, the cited "passage only highlights the difference between the prior art (manual switchover) and the alleged invention (no manual intervention). It is unrelated to balancing traffic based on traffic loads that existed at the time of a packet's arrival or at some undefined period thereafter." *Id.* at 8. Thus, Petitioner argues that "[t]he specification uses 'dynamic load-balancing' to mean that no manual switchover is required." *Id.*

We are not convinced by Petitioner's arguments. The cited portion of the specification discusses a configuration in which a LAN "may be set up to send all traffic from the accounting and sales departments to router A1 and send all traffic from the engineering department to router B1." Ex. 1001, 2:55–61. Petitioner argues that the key point here is that this prior art configuration required a manual switchover. Reply 8. There, however, is no reason for us to conclude that dynamic load balancing should be equated

with either a manual or an automated environment. The cited passage distinguished routing by departments from dynamic load balancing by stating that the department-based routing is not dynamic because in dynamic load balancing the “router loads dynamically in response to *actual* traffic.” *Id.* at 2:63–64. We find that the cited passages show that the contemplated load balancing is performed based on actual traffic, but are insufficient to establish that the Patentee intended load balancing to be equated with a manual selection process. *See Id.* at 2:61–65, 7:31–32.

Further, we are not convinced by Patent Owner’s arguments regarding the alleged requirement that traffic be assessed at some point after the packet’s arrival. The portion of the specification cited in support of this assertion refers to multiple scenarios or “cases.” *See* PO Resp. 16 (citing Ex. 1001, 14:53–58). The specification states that in one of those cases the path may be determined after the packet arrives and states that, for example, the path determination may be done using dynamic load balancing. *See* Ex. 1001, 14:53–58. This passage does not provide any specific temporal limitation to the term “dynamic load balancing,” but rather it illustrates an example of when load balancing could be used. It is improper to limit the claims to this one exemplary embodiment without more express language in the claims or the specification that would narrow the scope of this term. Thus, we find that the proper construction of dynamic load balancing is “distributing packets based on actual traffic.”

III. ANALYSIS

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 establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Thus, we examine the full record in this matter to determine whether Petitioner has met its burden under 35 U.S.C. § 316(e).

A. Asserted Ground of Unpatentability over Karol

Petitioner asserts that claims 4, 5, 7–11, 14, and 19 are anticipated by the disclosures of Karol. Pet. 10–30. Petitioner also contends that claims 4, 5, 7–15, and 19 would have been obvious over the teachings of Karol. *Id.* at 42–60. Petitioner supports its arguments with a declaration from Dr. Kevin Negus. Ex. 1005.

1. Overview of Karol

Karol is directed to “the internetworking of connectionless (e.g., Internet Protocol or ‘IP’) and connection oriented (e.g., ATM, MPLS, RSVP) networks.” Ex. 1006, 1:7–10. Connectionless (“CL”) networks require no explicit connection setup prior to transmitting datagrams. *Id.* at 1:19–24. In contrast, connection oriented (“CO”) networks determine a route for the connection and allocate bandwidth resources along the route. *Id.* at 1:31–39. Figure 1 of Karol is reproduced below.

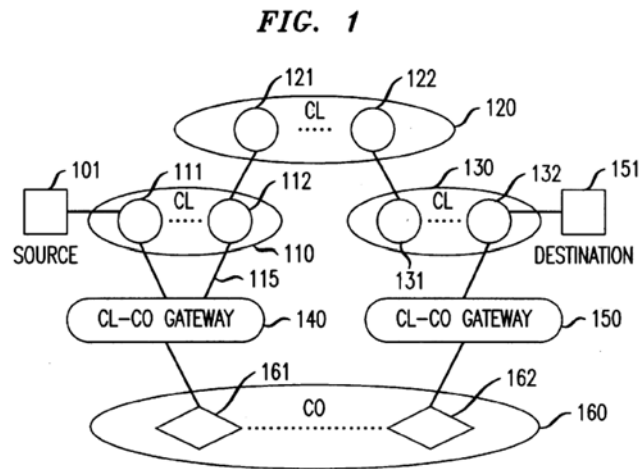


Figure 1 depicts CO and CL networks in a parallel configuration. *Id.* at 4:12–14. Datagrams ultimately destined for endpoint 151 may be sent from source 101 to node 111 in CL network 110. *Id.* at 4:39–40. The source or destination may be connected directly to CL-CO gateway 140 or they may be connected through a node in the network. *Id.* at 5:5–8. The datagrams may be routed over either the CO or CL network in order to arrive at endpoint 151. *Id.* at 4:40–43. CL-CO gateways 140 and 150 interconnect the CL and CO networks and “allow[] datagrams (sometimes hereinafter called messages) originated on the CL network to be transported . . . on the CO network.” *Id.* at 3:30–37. “When a datagram arrives at CL-CO gateway 140 of FIG. 1, a determination is made if that packet should be carried by CO network 160.” *Id.* at 5:23–25. CL-CO gateway 140 is described in more detail in Figure 4, which is reproduced below.

FIG. 4

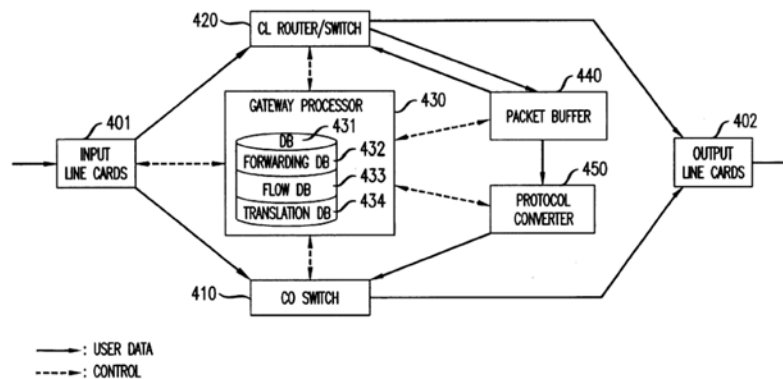


Figure 4 illustrates the internal arrangements of CL-CO gateway 140. *Id.* at 6:31–32.

Generally speaking, each CL-CO gateway arranged in accordance with the present invention includes hardware and software modules that typically comprise (a) a switch fabric for CO networking, shown in FIG. 4 as CO switch 410, (b) a CL packet forwarding engine, shown in FIG. 4 as CL router/switch 420, (c) a protocol converter 450, (d) a moderately sized packet buffer 440 for temporarily storing packets waiting for CO network setup or turnaround; and (e) a processor 430 and associated database 431 for controlling the gateway packet handling operations and for storing forwarding, flow control, header translation and other information. Input line cards 401 and output line cards 402 connect the gateway of FIG. 4 to external networks, such that datagrams received in input line cards 401 can be directed either to CO switch 410 or CL router/switch 420, and such that output line cards 402 can receive datagrams from either of the last mentioned elements and direct them to external networks.

Id. at 6:32–50. The elements depicted in Figure 4 are controlled by processor 430 and such control is implemented via programs stored in the processor. *Id.* at 6:55–59. The routing procedures used by gateway 140 may adjust routing dynamically “to divert connections away from

overloaded call processors.” *Id.* at 17:64–67. In other words, routing “can be adjusted to reflect bandwidth availability.” *Id.* at 18:1–2.

2. *Independent Claim 4*

Claim 4 recites a controller, which controls access to multiple networks. Petitioner’s arguments as to independent claim 4 may be summarized as follows: Petitioner argues in the alternative that the claimed controller that provides access to multiple networks may be either Karol’s CL-CO gateway alone or the gateway in combination with one or more routers or switches. Pet. 10–12. If the controller is the gateway alone, then Petitioner asserts that the site interface is disclosed by one or more of Karol’s input line cards 401 or the network connection depicted in Figure 1 between source 101 and node 111. *Id.* at 12. If the controller is the gateway in combination with routers and/or switches, then Petitioner asserts the site interface is a network connection. *Id.* According to Petitioner, Karol discloses at least two output line cards 402 that receive datagrams from the CO switch or CL router/switch and directs the datagrams to external networks. *Id.* at 12–13. In addition, we note that Karol discloses that “the source or destination may be directly connected to a CL-CO gateway (e.g., gateway 140) as opposed to being connected through a CL node.” Ex. 1006, 5:5–8. As to the packet path selector, Petitioner points to Karol’s gateway processor, CL router/switch, CO switch, packet buffer, protocol converter and input line cards to disclose this element of the claim. Pet. 14. Petitioner asserts that these items work together in Karol to determine if a packet (“datagram”) from a source should be forwarded to either the CL or CO network. *Id.* Petitioner relies on Karol’s disclosure of routing datagrams based on “‘bandwidth availability’ that can be ‘dynamically allocated to

flows on an as-needed basis’ and can ‘divert[] connections away from congested links.’ *Id.* at 15 (citing Ex. 1006, 17:18–26, 17:63–18:2; Ex. 1005 ¶ 182).

Patent Owner argues that Karol does not disclose “a packet path selector which selects between network interfaces on a per-packet basis.” PO Resp. 23. Patent Owner supports its contentions with declarations from Joel Williams. Exs. 2001, 2003.

Specifically, Patent Owner contends that Karol does not disclose the selection of paths on a per packet basis as required by claim 4. PO Resp. 23–28. This argument is based on Patent Owner’s contentions that (1) Karol does not select a network when a packet arrives, but rather it routes packets based on precomputed routes; and (2) Karol’s path selection occurs infrequently and not on a per-packet basis. *Id.*

Petitioner asserts that Karol’s system “selects between network interfaces on a per-packet basis” (e.g., packet path selector compares information in each packet received at the CL-CO gateway to determine if the packet will be routed to the CL or CO network interface output line card). Pet. 15–16. Petitioner’s declarant, Dr. Kevin Negus, testifies that this path selection occurs by examining the packet’s destination, the optional presence of alternative paths to that destination, and at least one specified criteria for selecting between alternative paths. Ex. 1005 ¶ 187.

Karol states that “[w]hen a datagram arrives at a CL-CO gateway 140 of FIG. 1, a determination is made if that packet should be carried by the CO network 160.” Ex. 1006, 5:23–25. Patent Owner, however, asserts that this determination is not an individualized selection of a route for a specific packet, but rather it is a determination as to whether a packet is part of a

group of packets (a flow) for which a routing decision previously has been made. PO Resp. 24. Figure 5 of Karol is reproduced below.

FIG. 5

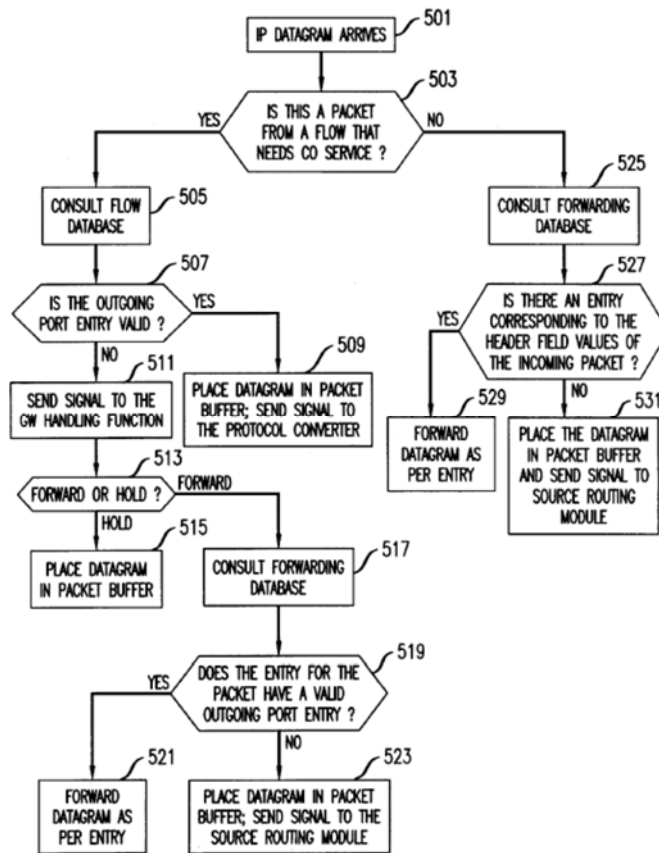


Figure 5 of Karol depicts the packet forwarding process. Ex. 1006, 3:6–8. In step 501, a packet arrives at Karol’s CL router/switch 420. *Id.* at 8:56–58. Step 503, then inquires as to whether the received packet is “a packet *from a flow that needs CO Service.*” *Id.* at Fig. 5, element 503 (emphasis added). Thus, we determine that Karol’s routing decisions are made for a flow of packets and not for an individual packet.

As discussed above, we construe claim 4’s “per packet basis” to require “selecting a network path/interface for each packet.” *See supra* § II.A. Thus, we find that Karol does not disclose the per packet selection

required in claim 4. Therefore, we determine that Petitioner has not met its burden to establish that claim 4 is anticipated by Karol.

Petitioner, however, also argues that claim 4 would have been obvious over Karol. Petitioner expands upon its anticipation arguments with arguments in which it explains why Karol combined with the knowledge of one of ordinary skill in the art would have rendered claim 4 obvious. Pet. 42–60.

Petitioner argues that if we construe “per-packet basis” to require selection for each packet then Karol would have rendered this limitation obvious. Pet. 45. Petitioner asserts that this limitation would have been obvious because (1) modifying Karol to select networks on a per-packet basis would have amounted to nothing more than the simple substitution of one known element for another to obtain predictable results (*id.* at 45); and (2) the combination of Karol and the knowledge of one of ordinary skill in the art would have been obvious to try (*id.* at 46).

Petitioner contends that the ’235 patent describes the “prior art [as] disclos[ing] routing decisions that are independent of the particular flows or sessions of particular packets.” *Id.* at 45 (citing Ex. 1001, 4:15–23; Ex. 1005 ¶ 192). Petitioner relies upon a passage from the ’235 patent, which describes a “prior approach[] for selecting which network to use for which packet(s)” in which decisions are made based on the origin of the packet.” Ex. 1001, 4:15–23. In contrast, Karol describes a selection process in which the gateway makes a determination as to which network should receive the packet based on its examination of the fields of Karol’s flow database, which includes “source address” as one of its fields. *Id.* at 46. Petitioner asserts that it would have been obvious to modify Karol by limiting the routing

decision to an analysis of the packet's source address. *Id.* In support of this position, Dr. Negus testifies that such a modification would entail “a much simpler and known packet path selection process.” Ex. 1005 ¶ 193.

Patent Owner asserts that Karol's gateway uses OSPF (Open Shortest Path First) to determine routing prior to a packet being received at the gateway. PO Resp. 26. Patent Owner further contends that “[t]he OSPF routing protocol expressly excludes the possibility of making packet routing decisions on a per-packet basis.” *Id.* at 27. We find this to be an overly narrow view of Karol's disclosures because Karol is not limited to OSPF. *See* Ex. 1006, 14:20–22 (“the description below assumes the OSPF routing protocol, the concept is readily applicable to other IP routing protocols”).

We determine that Petitioner has shown that it would have been obvious to modify Karol to select networks on a per packet basis. Petitioner has proposed a modification to Karol that is “much simpler” and therefore, we find that one of ordinary skill in the art would have been motivated to make this modification in order to reduce system complexity. Petitioner has provided arguments and evidence sufficient to show that this modification would be within the abilities of one of ordinary skill in the art and that there would have been a reasonable expectation of success. Thus, we find that Petitioner has set forth sufficient evidence to demonstrate that it would have been obvious to modify Karol in a manner that would have taught this limitation.

Patent Owner also argues that Petitioner has not shown that claim 4's “site interface” would have been taught by Karol. PO Resp. 28. Petitioner asserts that a “site” in Karol could be either the routers/switches connected to the CL-CO gateway and/or the source 101 and/or destination 151

endpoints, if the CL-CO gateway alone is the ‘controller,’ and the ‘site interface’ would be one or more of the input line cards 401 or a network connection.” Pet. 44 (citing Ex. 1005 ¶ 175). Patent Owner contends that Karol does not teach the recited “site interface” because Karol’s gateway (controller) only has “network interfaces” and does not have a “site interface.” PO Resp. 28. According to Patent Owner, “[t]he ‘site interface’ and the ‘network interfaces’ are separately claimed components that specifically connect the controller to a site and two or more networks, respectively.” *Id.* at 30. Patent Owner acknowledges that Karol’s Figure 1 shows an interface between source 101 and node 111. *Id.* at 32. Patent Owner, however, contends that this is not the site interface because the controller must be a single device (CL-CO gateway) and thus, the interface between source 101 and node 111 is not part of the controller as required by claim 4. *Id.* at 33.

Petitioner points out that claim 4 recites a controller “comprising” a site interface, at least two network interfaces, and a packet path selector. Petitioner contends, and we agree, that the use of the open-ended term “comprising” shows that the controller can include other elements and other devices. Reply 12–13. Thus, Petitioner argues that claim 4 explicitly defines the controller as a plurality of devices. *Id.* at 12 (citing Ex. 1001, 17:39–55). Further, [t]he claims [] do not preclude the use of routers and switches as part of the ‘controller’ to connect to the site. *Id.* at 13. Therefore, the controller properly may include the gateway and node 111. *Id.* at 14. Node 111 contains an interface to Source 101, and therefore Petitioner argues that these disclosures would have taught the recited site interface. *Id.*

We find Petitioner’s arguments and evidence to be persuasive. We agree with Petitioner’s contention that the “comprising” language used in claim 4 is broad enough to encompass a controller that includes multiple devices. As such, we see no impediment to including node 111 as part of the constellation of devices that renders obvious the recited controller. We determine that the interface between node 111 and source 101 would have taught the recited site interface. As an additional finding, we note that Karol discloses a direct connection between the source or destination site and the gateway. Ex. 1006, 5:5–8. Thus, we find that Petitioner has put forth sufficient evidence to show that this limitation would have been obvious to one of ordinary skill in the art over the disclosures of Karol.

We have reviewed Petitioner’s contentions and evidence regarding the alleged obviousness of claim 4 and find them to be persuasive. *See* Pet. 42–47. For the reasons discussed above, the arguments and evidence put forth by Patent Owner are not persuasive and we determine that Petitioner has met its burden to demonstrate that claim 4 would have been obvious over Karol. We find that Petitioner has not met its burden to show that claim 4 is anticipated by Karol.

3. Independent Claim 5

Petitioner asserts that claim 5 is anticipated by (Pet. 17–22) or would have been obvious over Karol (*id.* at 47–52). Claim 5 recites a method for combining connections for access to multiple parallel disparate networks. Based on our review of the full record we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 5 is anticipated by Karol and would have been obvious over Karol.

Petitioner’s allegations regarding independent claim 5 may be summarized as follows: Karol discloses multiple parallel disparate networks through its discussion of CL and CO networks. Pet. 17. Karol discloses obtaining at least two known location address ranges through its discussion of routing tables. *Id.* at 17–18. Petitioner further asserts that Karol’s routing tables contain information about route topology and connectivity. *Id.* at 19–21. Karol’s datagrams are relied upon to disclose a packet, which identifies a particular destination location. *Id.* at 21. Karol “compar[es] the destination IP address in each packet received at the CL-CO gateway to entries in the databases to determine if the destination address lies within the routing tables that include a known location address range for the destination location.” *Id.* Petitioner argues in the alternative that Karol’s discussion of the CL-CO gateway alone or the gateway in combination with its associated routers and/or switches discloses the step of selecting a network path from among the disparate parallel CO and CL networks. *Id.* at 22. In addition, Karol’s routing tables provide information as to the connectivity between the current location and the destination. *Id.* We find that this evidence, when considered in light of Patent Owner’s arguments and evidence, is sufficient to show the unpatentability of claim 5.

Patent Owner argues that Karol does not disclose “obtaining at least two known location address ranges which have associated networks.” PO Resp. 34–36. According to Patent Owner, “Karol discloses using only discrete addresses and not ranges in the flow database.” *Id.* at 34. Patent Owner explains that in the ’235 patent

an ‘address range’ is represented as an IP address with portions containing an “x,” which indicates that the full range of values possible for that address portion. The use of “.x.x” notation in

the '235 specification makes it clear that an address range is not a single address and is not a collection of disjoint addresses as in a routing table, but is instead a group of contiguous addresses.

Id. at 36 (citing Ex. 1001, 8:45–67).

We, however, are not convinced that the '235 patent's disclosures are so limited. The specification provides example of address ranges, but it does not require a specific format. For example, “[a]ddress ranges *may be specified* as partial addresses, e.g., partial IP addresses in which some but not all of the address is specified. Thus, ‘198.x.x.x’ indicates an IP address in which the first field is 198 and the other three address fields are not pinned down, corresponding to the range of addresses from 198.0.0.0 to 198.255.255.255.” Ex. 1001, 13:40–46 (emphasis added). This passage describes one way in which an address range may be represented. It, however, does not establish that a range must include more than one address. In addition, “a network *may have more than one* associated contiguous range of addresses which collectively constitute the address range for that network.” *Id.* at 13:47–49. Here, the specification provides an example of an address range composed of one or more ranges, but it does not require any particular number of addresses to be included in the range. We further note that the specification states that “in the claims a reference to an item normally means *at least one* such item is required.” Ex. 1001, 16:63–64 (emphasis added). Thus, based on our review of the intrinsic record, we find that the claimed address range is broad enough to include a single address.

Petitioner relies upon Karol's discussion of “routing tables that contain location addresses” to disclose this limitation. Pet. 17. Specifically, Petitioner directs us to Karol's forwarding database 432, which stores the

address of the next hop router, destination address, and the outgoing port. *Id.* at 17–18 (citing Ex. 1006, 7:36–41; Ex. 1005 ¶ 96, 221). In addition, Karol has a flow database 433, which stores similar information for use in the CO network. *Id.* at 18 (citing Ex. 1006, 7:42–54, Ex. 1005 ¶¶ 97, 222). Petitioner contends that the addresses stored in these databases are used to route flows to either the CO or CL network. *Id.* at 18 (citing Ex. 1006, 16:3–9; Ex. 1005 ¶¶ 106–110, 223). We find that Petitioner has shown sufficiently that the Karol’s routing table is used to obtain addresses that are associated with Karol’s CO and CL networks. Thus, we find that Petitioner has made a sufficient showing as to this limitation and we are not convinced by Patent Owner’s arguments.

Petitioner also put forth additional arguments stating why it believes that the recited address ranges would have been obvious over Karol and the knowledge of one of ordinary skill in the art. Pet. 48–49. In short, Petitioner argues that if this claim were construed to require the range to contain more than one address then it would have been obvious to modify Karol to use a range that includes more than a single address. *Id.* Petitioner asserts that this would have been obvious because such address ranges were known in the art and it “would have amounted to nothing more than the use of a known technique to improve similar methods in the same way or the combination of prior art elements according to known methods to yield predictable results.” *Id.* at 48.

Patent Owner argues that such a modification would not have been obvious because the purpose of the flow database is to identify a specific flow between source and destination hosts. PO Resp. 39. Thus, a person of ordinary skill “would have understood that the flow database would not be

able to determine how to handle packets from flows requiring a CO connection if the source and destination addresses were ranges.” *Id.* at 39. This proposed modification therefore would render Karol inoperable. *Id.*

We do not find Karol’s flow database to be so limited. As described in Karol, “[f]low database 433 stores information used to determine how to handle packets from flows requiring a connection-oriented service.” Ex. 1006, 7:41–44. Karol describes “[t]ypical fields in each record in the database,” but we find that this description of an exemplary database schema does not limit Karol to a single way to describe or handle a flow. *See id.* at 7:44–45. Petitioner provides evidence that one of ordinary skill in the art would have known how to use address ranges to identify a flow and thus, we determine that the proposed modification would not have rendered Karol inoperable. *See* Ex. 1005 ¶¶ 232–236. Thus, we are persuaded that Petitioner has shown by a preponderance of the evidence that claim 5 would have been obvious over Karol.

4. Analysis of Dependent Claims

Petitioner contends claims 7–11 and 14, which depend from claim 5, are anticipated by Karol. Pet. 22–27. Petitioner also contends that claims 7–15 would have been obvious over Karol. *Id.* at 52–59.

a. Dependent Claim 7

Claim 7 depends from claim 5 and further recites “wherein the forwarding step forwards the packet toward the Internet when the packet’s destination address does not lie within any known location address range.” Petitioner relies upon Karol’s disclosure of the router’s view of the CL network as the default path to disclose this limitation. Pet. 22–23 (citing Ex. 1006, 15:31–39; Ex. 1005 ¶¶ 297–299). Dr. Negus testifies that “the ‘CL

network’, which includes this ‘default path’, is a ‘connectionless network’ based upon the ‘Internet protocol.’” Ex. 1005 ¶ 299 (citing Ex. 1006, 1:7–8, 5:60–66).

Patent Owner asserts that Karol does not disclose this limitation because Karol’s routers are not aware of the CO network and thus, the router’s expectation that a packet will be routed on the CL network does not indicate a decision to forward packets to the Internet in the event that the destination address is not in the recited address range. PO Resp. 43. Patent Owner further explains that Karol discloses dropping a packet if the destination address is not found in the routing table. *Id.*

If the flow classification functionality within processor 430 determines that the packet should be handled in a CL mode, a NO result occurs in step 503. *In that event, forwarding database 432 is consulted in step 525 to determine if there is an entry corresponding to the header field values of the incoming datagram.* If the result of step 527 is YES, indicating that there is an entry in forwarding database 432 that matches the incoming packet header fields, the datagram is forwarded in accordance with that entry, in step 529. *Otherwise, if a NO result occurs in step 527, the datagram is dropped in step 531.*

Ex. 1006, 9:26–36 (emphases added).

Petitioner, however, persuasively argues that the term “dropped” as used in that passage does not mean that the packet is dropped or lost, but rather that the packet is dropped into a buffer. Tr. 32:1–11. In step 531 of Figure 5, Karol “place[s] the datagram in packet buffer and send[s] signal[s] to source routing module.” Ex. 1006, Fig. 5, step 531. The packet buffer is described as being used “for temporarily storing packets waiting for CO network setup or turnaround.” *Id.* at 2:23–24. Figures 6 and 7 describe the further processing of packets that have been sent to the packet buffer. *Id.* at

9:37–40; 3:9–16. Ultimately, the packets placed in the buffer are processed and “[i]f there is not a valid entry in the database, the datagram is placed in packet buffer 440 in step 707, and a signal is sent to the processor 430 to forward these packets on the CL network using source routing.” *Id.* at 11:22–26. Thus, we are persuaded by Petitioner’s contentions that Karol discloses forwarding a packet to the Internet when the destination address is not in the recited ranges. Therefore, we find that Petitioner has met its burden to show by a preponderance of the evidence that claim 7 is anticipated by Karol.

Petitioner puts forth the additional argument that Karol and the knowledge of one of ordinary skill in the art would have rendered this claim obvious. Pet. 52–53. In short, Petitioner asserts that forwarding a packet to the Internet in the event that the packet has an unknown destination address only would have required the application of a known technique in a manner that would have yielded a predictable result. *Id.* According to Petitioner, such a technique would have been obvious to try in order to solve the common problem of resolving unknown destination addresses for packets because the Internet was in common usage at the time and thus, there would have been a high likelihood that the packet would have been successfully routed using the Internet. *Id.* at 53. Patent Owner argues that Petitioner did not put forth a sufficient obviousness case because it did not articulate why one of ordinary skill in the art would have been motivated to use the Internet as a default routing scheme. PO Resp. 44–45. We do not agree with Patent Owner because we find that Petitioner articulated a problem that one of ordinary skill in the art would have sought to solve (resolution of unknown destination addresses) and we find that this problem would have provided

sufficient motivation for one of ordinary skill in the art to use a known method such as default routing over the Internet. Thus, we determine that Petitioner has shown by a preponderance of the evidence that claim 7 would have been obvious over Karol.

b. Dependent Claim 8

Claim 8 depends from claim 5 and further recites “wherein the destination address identifies a destination location to which only a single associated network provides connectivity from the current location, and the forwarding step forwards the packet to that single associated network.”

According to Petitioner, Karol’s “packet path selection is based at least upon comparison of the packet destination address with network addresses maintained at the CL-CO gateway.” Pet. 23. If a packet has a destination address associated with a CO network the packet will be forwarded on the CL network if the CO network is unavailable. *Id.* Thus, Petitioner argues that the packet will be sent over the CL network if that is the only network that provides connectivity to that destination. Pet. 23–24.

Patent Owner asserts that Petitioner’s argument fails because packets routed to the CL network in steps 517, 519, and 523 are packets that have addresses associated with the CO network and yet these packets are routed on the CL network. PO Resp. 44–45. Thus, according to Patent Owner, the packets do not identify a destination location to which only a single associated network provides connectivity. *Id.* Petitioner responds by pointing out that the claim requires that a single associated network *provides connectivity*. See Reply 21–22. As such, the issue is not whether the address is associated with one or both networks, but rather whether

connectivity is provided by only a single network. *Id.* Thus, Petitioner asserts that Patent Owner's

argument fails because Karol's gateway only determines whether the packet should be carried by the CO network, but not which network "provides connectivity." (Ex. 1006, 5:23–25.) If the CO network is selected, then (as shown in Figure 5) the gateway determines which CO network can reach the destination (or provide connectivity), and if no valid outgoing port entry exists, then (as explained above) only the CL network can provide connectivity, and the packet is forwarded to the CL network. (Ex. 1006, Fig. 5.) In this scenario, the CL network is the only network that "provides connectivity," meeting the elements of claim 8.

Id. at 21–22. We agree with Petitioner's analysis of Karol's disclosures. If the CO network is unavailable then there is only one network that provides connectivity to the destination. Thus, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 8 is anticipated by Karol.

Petitioner also argues that claim 8 would have been obvious over Karol. Pet. 53–54. We have reviewed Petitioner's contentions and find them to be sufficient. Patent Owner's arguments in regards to claim 8 have all been addressed above and for those same reasons we also find Patent Owner's arguments not persuasive in regards to Petitioner's assertion of obviousness. Thus, we determine that Petitioner has shown by a preponderance of the evidence that claim 8 would have been obvious over Karol.

c. Dependent Claim 9

Claim 9 depends from claim 5 and further recites "wherein repeated instances of the selecting step make network path selections on a packet-by-packet basis." For reasons discussed above in the context of claim 4, we

determine that Petitioner has not established that Karol makes network selection on a packet-by-packet basis and thus, claim 9 is not anticipated by Karol. *See supra* § III.A.2. In that same vein, for reasons discussed above in the context of claim 4, we determine that Petitioner has established that claim 9 would have been obvious over Karol.

d. Dependent Claims 11–13

Claim 11 depends from claim 5 and further recites “wherein the selecting step selects the network path at least in part on the basis of a dynamic load-balancing criterion.” Petitioner asserts that claim 11 is anticipated by and would have been obvious over Karol. Pet. 25–26, 55–56. Claims 12 and 13 depend from claim 11 and Petitioner contends that these claims would have been obvious over Karol. *Id.* at 56.

As to claim 11’s recited dynamic load balancing, Petitioner relies upon Karol’s discussion of “a guaranteed quality of service for a specific flow” and Karol’s statements regarding “[t]he advantage to a service provider is that bandwidth utilization in a packet-switched CO network is better than in a CL network with precomputed routes since bandwidth can be dynamically allocated to flows on an as-needed basis.” Pet. 25–26 (citing Ex. 1006 at 17:18–26; Ex. 1005 ¶ 337). Further, Petitioner argues that Karol discloses that “dynamically adjusting link weights in the routing protocol can also be extended to include diverting connections away from congested links’ or ‘[i]n other words, link weights can be adjusted to reflect bandwidth availability.’” *Id.* at 26 (citing Ex. 1006, 17:63–18:2; Ex. 1005 ¶¶ 335–337).

Patent Owner argues that Karol does not perform dynamic load balancing per its proposed construction. PO Resp. 51–52. As noted above we construed dynamic load balancing to mean “distributing packets based

on actual traffic.” *See supra* § II.B. For reasons described above, we did not agree with the temporal limitations that Patent Owner sought to be included in this term. *Id.* Thus, we find unpersuasive Patent Owner’s arguments regarding when Karol’s system analyzes traffic. *See, e.g.*, PO Resp. 52–53 (arguing that Karol does not perform dynamic load balancing because traffic information is received “well in advance of any user’s packets reaching the CL-CO gateway”).

Thus, the issue is whether Karol balances the load between the networks based on “actual traffic.” We find that this is disclosed in Karol. Petitioner points out that “Karol discloses ‘dynamically adjusting link weights’ ‘to divert connections away from overloaded call processors.’” Reply 23 (citing Ex. 1006, 17:45–18:2). Karol states that “as the number of call-setup requests per second increases, the weight of the appropriate network link can be increased, so that future connections will tend to be routed away from this particular link. . . . In other words, it is advantageous to divert connections away from overloaded call processors by appropriately keeping the connections away from certain network links.” Ex. 1006, 17:55–62. Thus, the rerouting occurs based on the increase in call-setup requests and we find this to load balancing based on actual traffic. Therefore, we find that Petitioner has demonstrated by a preponderance of the evidence that Karol anticipates claim 11.

As to the obviousness grounds, Petitioner asserts that Karol and the knowledge of one of ordinary skill in the art would have rendered obvious the recited dynamic load balancing. Pet. 55. Specifically, Petitioner argues that one of ordinary skill would have been motivated to modify Karol in order “to avoid congested links or equalize loads over multiple paths.” *Id.*

(citing Ex. 1005 ¶ 351). Petitioner further contends that “[l]oad balancing was well-understood by a [person of ordinary skill in the art].” *Id.* Thus, a person of ordinary skill would have sought to solve the problem of link congestion by applying known techniques for load balancing. *Id.* at 55–56. We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Thus, we find that Petitioner has shown by a preponderance of the evidence that claim 11 would have been obvious over Karol.

Claim 12 further recites, in relevant part, that the dynamic load balancing “balance[s] line loads by distributing packets between lines.” Claim 13 further recites, in relevant part, that the dynamic load balancing “balance[s] network loads by distributing packets between disparate networks.” Petitioner asserts that these claims would have been obvious because Karol discloses disparate networks (i.e., CL and CO networks) and a load balancing scheme would have been used to balance the traffic between these disparate networks. Pet. 56. Further, the known dynamic load-balancing criterion were such that there were no alternatives in common usage that would not have balanced the load between the lines. *Id.* We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Thus, we find that Petitioner has shown by a preponderance of the evidence that claims 12 and 13 would have been obvious over Karol.

e. Dependent Claims 10, 14, and 15

Claim 10 depends from claim 5 and further recites “wherein repeated instances of the selecting step make network path selections on a per session basis.” As discussed above in the context of claim 4, we determine that

Petitioner has established that Karol discloses selecting a network for a flow of packets. *See supra* § III.A.2. We find that the selection per flow discloses the recited selection on a per session basis. A flow includes some number of packets (*see* Ex. 1006, 7:42–44) and we determine that the term flow as used in Karol is broad enough to encompass a session as recited in the '235 patent. Patent Owner makes no additional argument in regards to claim 10 other than those directed at the base claim, claim 5. *See generally* PO Resp. Thus, based on our review of the full record, we find that Petitioner has demonstrated by a preponderance of the evidence that claim 10 is anticipated by Karol.

Petitioner also argues that claim 10 would have been obvious over Karol. Pet. 54–55. We have reviewed Petitioner's contentions and find them to be sufficient. Thus, we determine that Petitioner has shown by a preponderance of the evidence that claim 10 would have been obvious over Karol.

Claim 14 depends from claim 5 and further recites “wherein the selecting step selects the network path at least in part on the basis of a reliability criterion.” Petitioner directs us to Karol's discussion of providing a user with “a guaranteed quality of service for a specific flow.” Pet. 26–27 (citing Ex. 1006, 17:18–26, 17:63–18:2; Ex. 1005 ¶¶ 387–389). We find this discussion to disclose the recited selection based on reliability criterion. Patent Owner makes no additional argument in regards to claim 14 other than those directed at the base claim, claim 5. *See generally* PO Resp. Thus, based on our review of the full record, we find that Petitioner has demonstrated by a preponderance of the evidence that claim 14 is anticipated by Karol.

Petitioner argues that Karol and the knowledge of one of ordinary skill in the art would have rendered obvious the limitations of claim 14. Pet. 57–58. Specifically, Petitioner argues that implementing reliability criterion in Karol only would have required the application of a known technique in a manner would have yielded predictable results. *Id.* at 57. Petitioner asserts that one of ordinary skill in the art would have been motivated “to avoid congested links or avoid[] portions of the network that have failed.” *Id.* In that effort, one of ordinary skill in the art would have sought to use well-understood techniques that were in common usage in order to solve that problem. *Id.* (citing Ex. 1005 ¶¶ 393–403). We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Thus, we find that Petitioner has shown by a preponderance of the evidence that claim 14 would have been obvious over Karol.

Claim 15 depends from claim 5 and further recites that the “selecting step selects the network path at least in part on the basis of a security criterion.” Petitioner asserts that “implementing a security criterion in Karol would have amounted to nothing more than the use of a known technique to improve similar methods in the same way or the combination of prior art elements according to known methods to yield predictable results.” Pet. 58 (citing Ex. 1005 ¶¶ 410, 417). Dr. Negus testifies that routing based on security criterion was known in the art and it would have been obvious to try the use of security based criterion in order to avoid links with inadequate security. Ex. 1005 ¶¶ 417, 420. We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Thus, we find that Petitioner has shown by a preponderance of the evidence that claim 15 would have been obvious over Karol.

5. Independent Claim 19

Similar to claim 5, independent claim 19 also is directed to combining connections for access to parallel networks. Many of Petitioner's contentions are similar to the contentions discussed above in regards to claims 4 and 5. *Compare* Pet. 59–60 (contentions regarding claim 19), *with id.* at 42–52 (contentions regarding claims 4 and 5). For the purpose of brevity, we focus our discussion here on the limitations that merit additional discussion.

Claim 19 recites, in relevant part, “wherein the step of sending a packet to the controller site interface is repeated as multiple packets are sent, and the controller sends different packets of a given message to different parallel networks.” Petitioner contends that “some datagrams carrying UDP segments within a message from the same source endpoint to the same destination endpoint are routed to the CL network while other datagrams carrying UDP segments within the same message from the same source endpoint to the same destination endpoint are routed to the CO network.” Pet. 30 (citing Ex. 1006, 10:25–39, 10:51–11:26, Fig. 6; Ex. 1005 ¶¶ 476–478). Dr. Negus supports this contention by testifying that Karol describes an embodiment, in which for particular sessions that use UDP transport layer, “the CL-CO gateway forwards some datagrams over the CO network and forwards other datagrams over the CL network.” Ex. 1005 ¶ 475 (citing Ex. 1006, 10:51–67, Fig. 6).

Patent Owner contends that “Karol only discusses sending some packets of a flow over the CL network while the CO connection is established.” PO Resp. 60 (citing Ex. 1006, 10:51–67). Further, Patent Owner argues that Karol includes “no discussion of dividing up a

‘message.’” *Id.* Finally, Patent Owner asserts that to the extent there is any diversion of packet from the CO to the CL network this only occurs when the initial connection is being established and thus, there is no “repeated” diversion of packets. *Id.*

We are not persuaded by Petitioner’s contention that Karol discloses sending different packets of a given message to different parallel networks. Karol does not describe any logical grouping of datagrams into a message. Ex. 2001 ¶¶72–74. On behalf of Patent Owner, Mr. Williams testifies that “Karol . . . never describes dividing up messages and sending those across disparate networks.” *Id.* ¶ 73. We note, that Karol uses the terms datagram and message in an interchangeable manner. *See* Ex. 1006, 1:10, 3:34–35 (“datagrams (sometimes hereinafter called messages)”). Karol also interchanges the terms packet and datagram. *See id.* 5:23–25. Thus, the mere use of the term “message” in Karol is not sufficient to show that Karol uses the term in the same manner as it is used in claim 19. We find Karol’s use of the terms datagram, packet, and message to be consistent with the ’235 patent’s use of the term packet because Karol treats these terms as disclosing a discrete unit of transmission that may be stored, halted, or turned around. Petitioner’s discussion of UDP segments is insufficient to establish that packets from a given message are sent to different networks because it is not clear from Karol’s disclosures that these UDP segments should be considered to be a “message.” Thus, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claim 19 is anticipated by Karol.

Petitioner’s obviousness allegations do not address the deficiency that we noted above in regards to anticipation. *See* Pet. 59–60; Ex. 1005 ¶¶ 472–

480. Thus, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claim 19 would have been obvious over Karol.

6. *Conclusions*

In conclusion, based on our review of the full record, we determine that Petitioner has put forth sufficient argument and evidence to establish by a preponderance of the evidence that claims 5, 7, 8, 10, 11, and 14 are anticipated by Karol. Petitioner has not met its burden as to its anticipation grounds directed to claims 4, 9, and 19. In addition, we determine that Petitioner has met its burden to demonstrate by a preponderance of the evidence that claims 4, 5, 7–15 would have been obvious over Karol. Petitioner has not met its burden as to its obviousness allegations directed to claim 19.

B. Asserted Obviousness over Karol and Stallings

1. Overview of Stallings

Stallings is a book titled *Data and Computer Communications*. Ex. 1011. Stallings is cited in the specification of Karol. Ex. 1006, 12:63–64. Internet protocol (“IP”) is discussed in Stallings as a tool to provide connectionless service between two networks. Ex. 1011, 534. Stallings describes an example in which system A is transmitting a datagram to system B and these systems are on different networks. *Id.* at 535. As part of the routing of that datagram, the router may construct a new packet by appending a header that includes the address of another router on a different network. *Id.* at 535–37. Routing in Stallings “is generally accomplished by maintaining a routing table in each end system and router that gives, for each

possible destination network, the next router to which the internet datagram should be sent.” *Id.* at 539.

Routing tables may be static or dynamic. *Id.* Dynamic tables, however, are “more flexible in responding to both error and congestion conditions.” *Id.* “Each router makes routing decisions based on knowledge of the topology and on the conditions of the internet.” *Id.* at 549. In complex networks, dynamic cooperation is necessary among the routers to avoid portions of the network that have failed or are congested. *Id.* Stallings also teaches that the computation of routes may be based on “user-configurable metric[s]” that may be based on factors such as “delay, data rate, dollar cost, or other factors.” *Id.* at 557. Such route computation may be configured to “equalize loads over multiple-equal cost paths.” *Id.*

2. Analysis of Asserted Obviousness of Claims 5, 11–15, and 19

Petitioner asserts that claims 5, 11–15, and 19 would have been obvious over the teachings of Karol and Stallings. Pet. 30–42. Petitioner supports its arguments with a declaration from Dr. Negus. Ex. 1005.

Petitioner relies upon similar disclosures from Karol in support of its asserted anticipation and obviousness grounds. *Compare* Pet. 10–30 (asserted anticipation of claims 4, 5, 7–11, 14, and 19) *and id.* at 42–60 (asserted obviousness over Karol of claims 4, 5, 7–15, and 19) *with id.* at 30–42 (asserted obviousness of claims 5, 11–15, and 19 over Karol and Stallings). Stallings is relied upon by Petitioner to provide additional teachings regarding routing tables. *See id.* at 30–42. Dr. Negus testifies that a person of ordinary skill in the art would have been motivated to combine the teachings of Karol and Stallings “because Karol explicitly references Stallings to describe attributes of the CL-CO gateway [] and both Karol and

Stallings describe the characteristics of network addresses in routers that can route packets over multiple parallel routes to a destination address as well as methods to obtain such network addresses.” Ex. 1005 ¶ 240 (citing Ex. 1006, 12:59–64).

a. Independent Claim 5

As to claim 5, Petitioner directs us to Stalling’s disclosure of IP routers with “routing tables” that route packets to any one of multiple networks using a range of end-system address associated with a particular route. Pet. 30–31. “Per Stallings, each ‘constituent network’ as identified by its ‘network identifier’ is a ‘subnetwork’ that comprises all of the range of host (or end system) identifiers within the subset range of possible destination or source addresses.” *Id.* at 31 (citing Ex. 1011, 528; Ex. 1005 ¶ 233). Petitioner asserts that “it would be obvious to use the routing tables disclosed in Stallings that can route packets to one of multiple network interfaces based upon the range of end-system addresses to route data on Karol’s parallel multiple networks which rely on routing addresses.” *Id.* (citing Ex. 1005 ¶¶ 233, 234). Petitioner asserts that this modification would merely have required the application of a known technique in order to achieve predictable results. *Id.* According to Petitioner, one of ordinary skill in the art “would look to combine Stallings because Karol cites to Stallings to describe attributes of Karol’s gateway to parallel data routes.” *Id.* at 32.

Patent Owner contends that Stallings does not teach the use of address ranges. PO Resp. 40. “At best, Stallings generally discusses the topics of routing, routing tables, and routing protocols.” *Id.* (internal citations omitted). We do not agree. Stallings describes the routing of a packet from

end system A to end system B. Ex. 1011, 535. As described in Stallings, the datagram includes a destination address B, “[t]he IP module in A recognizes that the destination (B) is on another subnetwork.” *Id.* Further, “[r]outing is generally accomplished by maintaining a routing table in each end system and router that gives, *for each possible destination network, the next router to which the internet datagram should be sent.*” *Id.* at 539 (emphasis added). Thus, Stallings’s routing table cannot contain just a single address because it maintains routing information for every destination.

Patent Owner further argues that Petitioner has not explained how Stallings could be combined with Karol. Similar to the argument discussed above in regards to obviousness over Karol alone, Patent Owner argues that Karol’s flow database must include individual addresses and not ranges and thus, it is unexplained how Karol could operate if the flow database is modified to include ranges. PO Resp. 41. For reasons discussed above, we are persuaded by Petitioner’s contentions that Karol’s flow database could be modified to use address ranges that include multiple addresses. *See supra* § III.A.3. (rejecting Patent Owner’s contention that Karol would be inoperable if modified to use address ranges).

We are persuaded that Petitioner has set forth sufficient rationale to support its obviousness assertion regarding claim 5. Thus, we are persuaded that Petitioner has established by a preponderance of the evidence that claim 5 would have been obvious over the teachings of Karol and Stallings.

b. Dependent Claims 11–15

Claims 11–15 depend from claim 5. Petitioner asserts that each of these claims would have been obvious over Karol and Stallings. Pet. 35–42.

Petitioner relies upon Stallings as part of the analysis of the base claim 5, but it also provide additional analysis regarding certain limitations of the challenged dependent claims. For reasons discussed below, we find these assertions of obviousness to be persuasive and we determine that Petitioner has met its burden as to dependent claims 11–15.

(1) Claims 11–13

Claim 11 depends from claim 5 and further recites “wherein the selecting step selects the network path at least in part on the basis of a dynamic load-balancing criterion.” Claims 12 and 13 depend from claim 11. As discussed above, claims 12 and 13 further recite the balancing of the load between lines and between disparate networks.

Petitioner directs us to Stallings’s disclosure of dynamic routing tables that are flexible in responding to both error and congestion conditions. Pet. 35 (citing Ex. 1011, 539; Ex. 1005 ¶ 345). Petitioner asserts that Stallings’s routing tables are able to equalize loads over multiple equal-cost paths. *Id.* (citing Ex. 1011, 557; Ex. 1005 ¶ 346). Petitioner asserts that the teachings of Karol and Stallings would have been combined in order to avoid congestion and equalize loads. *Id.* at 36. Petitioner contends that this modification would have required the application of a known technique in a manner that would have achieved a predictable result. *Id.*

Patent Owner contends that Stallings “discussion of equalizing loads over multiple equal-cost paths (Ex. 1011, 557) is not relevant to load-balancing.” PO Resp. 54. Patent Owner cites to testimony from Dr. Negus to support this contention. According to Patent Owner, Dr. Negus stated that Stallings was not applicable to load balancing. *Id.* We, however, find this to mischaracterize the testimony.

[]QUESTION: Would one of ordinary skill in the art understand that equalizing loads over multiple equal-cost paths, as referenced in Stallings, is useful for packet-by-packet load-balancing? []

THE WITNESS: I believe that a person of ordinary skill would not see this – or would view this disclosure within Stallings as applicable to any type of load balancing, whether done on a per-packet basis or any other basis. I don't see that one of ordinary skill would look at this and go, "Oh, yeah, this is only for per-packet-based load balancing or only for some other basis for doing load balancing."

Ex. 2007, 95:25–96:13. Viewed in context, Dr. Negus's testimony is that Stallings would be applicable to "any type of load balancing."

Thus, we are not persuaded by Patent Owner's argument. We determine that Petitioner has provided sufficient rationale to support its assertion of obviousness of claims 11–13 over the teachings of Karol and Stallings. Therefore, we determine that Petitioner has established by a preponderance of the evidence that claim 11–13 would have been obvious over Karol and Stallings.

(2) Claim 14

Claim 14 depends from claim 5 and further recites "wherein the selecting step selects the network path at least in part on the basis of reliability criterion." Petitioner directs us to Stallings's teachings regarding a reliability criterion known as Internet Control Message Protocol ("ICMP") in which the provision of feedback regarding communications problems is used to determine if a datagram can reach its intended destination. Pet. 38–39 (citing Ex. 1011, 546–549; Ex. 1005 ¶ 401). Petitioner asserts that this exemplary reliability criterion could have been applied to Karol's system to allow the system to avoid congested or failed links. *Id.* at 39 (citing Ex.

1005 ¶ 406). We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Patent Owner makes no additional argument in regards to claim 14 other than those directed at the base claim, claim 5. *See generally* PO Resp. Thus, based on our review of the full record, we find that Petitioner has demonstrated by a preponderance of the evidence that claim 14 is would have been obvious over the teachings of Karol and Stallings.

(3) Claim 15

Claim 15 depends from claim 5 and further recites that the “selecting step selects the network path at least in part on the basis of a security criterion.” Petitioner asserts that Stallings teaches the use of routing tables “to support other internetworking services such as those governing security.” Pet. 40 (citing Ex. 1011, 539, Ex. 1005 ¶ 412) (emphasis omitted). Petitioner asserts that modifying Karol to apply the teachings of Stallings would merely have required the application of a known technique in order to achieve predictable results. *Id.* According to Petitioner, one of ordinary skill in the art “would look to combine Stallings because Karol cites to Stallings to describe attributes of Karol’s gateway to parallel data routes.” *Id.* at 41. We find that Petitioner has put forth a sufficient rationale and evidence to support its assertion of obviousness. Thus, we find that Petitioner has shown by a preponderance of the evidence that claim 15 would have been obvious over Karol and Stallings.

c. Independent Claim 19

Petitioner does not assert that Stallings remedies the deficiency we noted above as to Petitioner’s assertion of obviousness of claim 19 over Karol. *See supra* § III.A.5; Pet. 42. Thus, we find that Petitioner has not

met its burden to establish the unpatentability of claim 19 over Karol and Stallings.

3. *Conclusions*

In conclusion, based on our review of the full record, we determine that Petitioner has put forth sufficient argument and evidence to establish by a preponderance of the evidence that claims 5 and 11–15 would have been obvious over Karol and Stallings. Petitioner has not met its burden as to its obviousness allegations directed to claim 19.

IV. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that: (1) claims 5, 7, 8, 10, 11, and 14 are anticipated by Karol; (2) claims 4, 5, and 7–15 would have been obvious over Karol; and (3) claims 5 and 11–15 would have been obvious over Karol and Stallings. Petitioner has not shown by a preponderance of the evidence that claim 19 is unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 4, 5, and 7–15 of the '235 patent are held *unpatentable*;

FURTHER ORDERED that claim 19 has not been shown to be unpatentable; and

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

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