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Paper 34
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

MONARCH NETWORKING SOLUTIONS LLC,
Patent Owner.

IPR2024-00175
Patent 8,693,369 B2

Before THU A. DANG, CHARLES J. BOUDREAU, and NORMAN H. BEAMER, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Granting Patent Owner's Unopposed Motion To Accept
New Evidence In The Form Of A Declaration
37 C.F.R. § 42.5(b)

I. INTRODUCTION

On November 10, 2023, Juniper Networks, Inc. ("Petitioner") filed a Petition ("Pet.") pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–17 of U.S. Patent No. 8,693,369 B2 ("the '369 patent"). Paper 1. In support of the Petition, Petitioner filed a Declaration of Dr. Samrat Bhattacharjee. Ex. 1003. On May 8, 2024, we instituted *Inter Partes* Review. Paper 12. Subsequently, Patent Owner filed a Response ("PO Resp."), Petitioner filed a Reply ("Reply"), and Patent Owner filed a Sur-Reply ("Sur-Reply"). Papers 15, 20, 21. Patent Owner filed a Declaration of Daniel Minoli in support of the Response (Ex. 2014), Petitioner filed a Supplemental Declaration of Dr. Bhattacharjee in support of the Reply (Ex. 1039), and Patent Owner filed an additional Declaration of Mr. Minoli in support of the Sur-Reply (Ex. 2015). Petitioner was also authorized to file a Supplemental Brief Regarding Patent Owner's Sur-Reply Expert Declaration ("Supp.Br."). Paper 29; *see* Ex. 3003. An oral hearing was held on February 5, 2025, and a copy of the transcript was entered into the record. Paper 33 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a). Based on the complete record, we find that Petitioner has shown, by a preponderance of the evidence, that claims 7, 9–11, 13, 14, 16, and 17 of the '369 patent are unpatentable but that claims 1–6, 8, 12, and 15 have not been shown to be unpatentable.

II. BACKGROUND

A. The '369 Patent

The '369 patent, titled "Method Of Routing A Data Packet In A Network and An Associated Device," was filed on March 31, 2009, and issued on April 8, 2014, with an undisputed priority date of March 31, 2008. Ex. 1001, codes (54), (22), (45), (30); Pet. 8; PO Resp. 8. The '369 patent is directed to methods for routing a data packet in a telecommunications network, particularly Internet Protocol (IP)-based networks in which packets of data are transported from source equipment to destination equipment identified by a destination address. *Id.* at code (57), 1:15–18. As explained by Dr. Bhattacharjee, the IP defines the syntax of packet addresses, and in particular IP version 4 (IPv4) provides for 32-bit addresses, which can accommodate over four billion unique addresses. Ex. 1003 ¶¶ 27–29. As of the filing date of the '369 patent, it was commonly accepted in the IP service provider community that, despite the availability of over four billion public IPv4 addresses, exhaustion of this supply of addresses was inevitable. Ex. 1001, 1:53–54.

One approach to ameliorating this address exhaustion problem was to store a Network Address Translation (NAT) table (also referred to as Network Address And Port Translation (NAPT)) in a home gateway between terminal equipment of a private home network and the public telecommunications network. Ex.1001, 1:45–53; Ex. 1003 ¶ 30, n.1. A NAT table associates private IP addresses and the ports of the terminals inside the private network with the IPv4-type public IP address and a port of

the gateway. Ex. 1001, 1:45–53.[1] Using the NAT approach, when a terminal in the private network sent a packet through the gateway to the public network, the gateway, using the NAT table, translated the private IP address and a port number of the terminal to the public IP address and a port number of the gateway, thus allowing a single public IP address to stand in for numerous terminal private IP addresses inside the private network. Ex. 1001, Fig. 1, 1:66–2:18; Ex. 1003 ¶¶ 32–34. The process was reversed for incoming packets sent from the public network to an internal terminal via the gateway. *Id.*

The '369 patent modifies the NAT approach by taking advantage of the fact that terminal equipment does not make use simultaneously of all the 2^{16} (*i.e.*, 65,536) port number values available, and therefore each piece of terminal equipment in the private network can be assigned a lesser range of port numbers that is uniquely associated with that terminal. Ex. 1001, 7:12–28. The port number range is provided to the terminal in the form of a mask, which uses bit values to define the range. *Id.* at Figs. 2A, 2B, 7:29–67. As a simplified example, using 10-bit binary numbers, a mask for the range 0–15 could be 1111110000, and performing a bit-wise AND operation between the mask and a particular port number would yield a non-zero result if a bit value in the number equaled one in any of the six most significant bits of the number, which would indicate that the number fell

[1] Ports associated with devices on a network typically were assigned 16-bit port numbers, thus potentially accommodating approximately 65,000 ports for each device, although only a small portion were normally used for a given device. Ex. 1003 ¶ 31.

outside the range. Ex. 1003 ¶¶ 41–43. If the AND operation yielded all zeros, then that meant the port number fell within the range. *Id.*

With this arrangement, when a terminal in the private network sends a packet through the gateway to the public network, the gateway translates the private IP address of the terminal to the public IP address of the gateway but transmits the port number of the terminal (a number within the terminal's assigned range) unchanged. Ex.1001, 13:42–50. The gateway stores the association of the port mask of the terminal with its private IP address. *Id.* at 8:44–48. For incoming packets sent from the public network to an internal terminal via the gateway, the gateway determines which port mask the incoming port number belongs to, which in turn identifies the private IP address of the destination terminal. *Id.* at 8:21–36.

The '369 patent asserts:

> Thus the invention is based on an entirely novel and inventive approach to routing a data packet that relies on a unique combination consisting of the destination address of the packet, the port mask defining a range of port numbers that includes the destination port number of the received packet and a routing identifier of the destination terminal equipment. The invention thus makes it possible to assign the same routable primary address in the telecommunications network to a plurality of pieces of terminal equipment connected to that network and thus to economize on the use of public IP addresses without having recourse to the Operator NAT solution. The invention thus constitutes a solution to the exhaustion of IPv4 addresses that is simple, effective, and continuous with standard practices in the field.

Ex. 1001, 3:11–29.

B. Illustrative Claim

Claims 1–6 and 15 generally relate to routing IP packets, and claims 7–14, 16, and 17 generally relate to configuring terminal equipment for such routing. PO Resp. 7. Independent claims 1 and 7 are, respectively, representative of the former and latter groups, and are reproduced below.[2]

> 1. A method of routing an IP data packet in a telecommunications network to a destination equipment, said packet comprising a primary destination address and a destination port number, said method comprising, on reception of said packet, the following steps:
>
> [a] determining a port mask assigned to the destination equipment, the port mask defining a range of port numbers to which the destination port number belongs;
>
> [b] selecting at least one identifier of the destination equipment of the packet from a plurality of equipment identifiers associated with said primary destination address based on the port mask; and
>
> [c] routing the packet to the destination equipment based on said identifier.
>
> 7. A method of configuring a piece of terminal equipment connected to a telecommunications network, comprising, on reception of a configuration request sent by said equipment, the following steps:
>
> [a] assigning to said piece of terminal equipment a primary address shared with a plurality of pieces of terminal equipment;

[2] The bracketed letters and paragraph arrangement are taken from the Petition but do not impact our analysis. Pet. viii, ix; *see also* PO Resp. 7–8.

[b] assigning to said piece of terminal equipment a port mask defining a range of numbers dedicated to it and a routing identifier; and

[c] sending to said piece of terminal equipment a configuration message comprising said primary address, said port mask, and said routing identifier.

Ex. 1001, 14:15–28, 15:3–15.

C. Asserted Challenges to Patentability

Petitioner challenges the patentability of claims 1–17 of the '369 patent on the following bases (Pet. 4):

Claims Challenged	35 U.S.C. §[3]	References
7–14, 16, 17	103	Biswas[4], Kumar[5]
1–3, 5, 6, 15	103	Fangman[6], Kumar
1–3, 5, 6, 15	103	King[7], Kumar

[3] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included amendments to 35 U.S.C. §§ 102 and 103 that became effective after the priority date of the '369 patent. Therefore, we apply the pre-AIA versions of these sections.

[4] Biswas et al., US 8,019,889 B1, filed May 31, 2002, issued September 13, 2011 ("Biswas"). Ex. 1022.

[5] Kumar et al., US 7,394,809 B2, filed March 31, 2003, issued July 1, 2008 ("Kumar"). Ex. 1023.

[6] Fangman et al., US 7,068,647 B2, filed July 11, 2001, issued June 27, 2006 ("Fangman"). Ex. 1024.

[7] King et al., US 8,032,639 B2, filed May 23, 2006, issued October 4, 2011 ("King"). Ex. 1025.

Claims Challenged	35 U.S.C. §[3]	References
4	103	Fangman, Kumar, RFC 791[8]
4	103	King, Kumar, RFC 791

D. Real Parties in Interest

The parties identify themselves as the real parties in interest. Pet. 1; Paper 10, 2.

E. Related Proceedings

The parties identify the following as related proceedings: *Monarch Networking Solutions LLC v. Juniper Networks, Inc.*, Case No. 1:23-cv-00670-TSE-LRV (E.D. Va.), transferred; *Monarch Networking Solutions LLC v. Juniper Networks, Inc.*, Case No. 4:23-cv-05076-JST (N.D. Cal.), pending; *Ex Parte* Reexamination No. 90/015,315, pending, and stayed pending resolution of this proceeding. Pet. 2; Paper 10, 2; Paper 19.

III. ANALYSIS OF PETITIONER'S CHALLENGE

A. Legal Standards

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes*

[8] RFC 791, "DARPA Internet Program Protocol Specification" (September 1981) ("RFC 791"). Ex. 1026.

review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness (also called secondary considerations), such as commercial success, long-felt but unsolved needs, and failure of others.[9] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze grounds based on obviousness in accordance with the above-stated principles.

B. Level of Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103(a) requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. The person of ordinary skill in the art ("POSITA") is a

[9] No evidence of objective indicia of nonobviousness is of record.

hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner asserts that a person of ordinary skill in the art at the time of the alleged invention of the '369 patent:

> [W]ould have had a B.S. degree in electrical engineering, computer engineering, computer science, or a related subject, and three years of work experience in computer networking, including experience with the IPv4 protocol, or a related field . . . . Lack of professional experience can be remedied by additional education, and vice versa . . . .

Pet. 14 (citing Ex. 1003 ¶¶ 62–64). Patent Owner does not dispute Petitioner's proposal. PO Resp. 8–9.

Petitioner's proposal is consistent with the level of ordinary skill in the art as reflected by the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579. On this record, the level of ordinary skill is neither in dispute nor dispositive of any challenge. For purposes of this Decision, we apply Petitioner's articulation.

C. Claim Construction

The Petition was accorded a filing date of November 10, 2023. Paper 3, 1. In an *inter partes* review for a petition filed on or after November 13, 2018, a claim "shall be construed using the same claim

construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b). Since the Petition was filed after November 13, 2018, we apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (*en banc*).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). The parties submit that no claim construction is necessary. Pet. 14; PO Resp. 15. We have not been presented with the need to construe any claim terms for this Decision.

D. Alleged Obviousness of Claims 7–14, 16, and 17 over Biswas and Kumar

Petitioner challenges claims 7–14, 16, and 17 as obvious over the combination of Biswas and Kumar. Pet. 14–38.

1. Biswas

Biswas, titled "Method And Apparatus For Making End-Host Network Address Translation (NAT) Global Address And Port Ranges Aware," issued September 13, 2011, from an application filed May 31, 2002. Ex. 1022, codes (54), (45), (22). Biswas describes performing network address translation on data transmitted within a computer network. *Id.* at 1:9–12. Biswas recognizes that the IPv4 address protocol provided for an insufficient number of unique addresses given the "explosion of the Internet." *Id.* at 1:13–24. Biswas notes use of NAT tables (described above) as one then-existing solution to the limited address problem. *Id.* at 1:25–27.

As an alternative, Biswas provides for a host in a private network to obtain from an edge router, via a DHCP (Dynamic Host Configuration Protocol) request, a local address, a global address, and a global port range. *Id.* at Figs. 3A, 8, 2:25–59, 6:41–67, 11:25–39. When the host sends data to a destination in a public network, it uses the global address and a port number within its assigned port range. *Id.* at Fig. 8, 2:34–52, 11:50–57, 12:11–16. The edge routers keep track of the port ranges assigned to their associated hosts, so that the destination port number of incoming data is sent to the correct host. *Id.* at 7:1–8.

2. Kumar

Kumar, titled "Method And Apparatus For Packet Classification Using A Forest Of Hash Tables Data Structure," issued July 1, 2008, from an application filed March 31, 2003. Ex. 1023, codes (54), (45), (22). Biswas describes a packet classifier that uses rules that specify sets of criteria applied to a packet to determine whether to perform a specified action on the packet, such as accepting or blocking the packet. *Id.* at code (57), 7:14–38. A rule can be in the form of a mask to specify, for example, a range of values that a packet address of port number can have to satisfy the rule. *Id.* at 7:31–34, 7:39–48. For example, the bit mask 1111110000000000 may specify a rule that a packet is blocked if the destination port number is less than or equal to 1023. *Id.* at Figs. 7A, 7B, 7:58–63, 8:5, 8:14–19, 8:34–35.

3. The Combination of Biswas and Kumar

Petitioner argues that one of ordinary skill would have been motivated to apply the use of masks to define port number ranges, as disclosed in Kumar, in order to implement the disclosed operation in Biswas of edge routers providing port ranges to hosts. Pet. 17–18 (citing Ex. 1003 ¶ 77). Petitioner argues that both references are in the same field of computer networking and routing data packets, that one of ordinary skill would have been motivated to look beyond Biswas for implementation details on how the edge router would provide port ranges to hosts, and that the use of masks as discussed in Kumar was a well-known technique for accomplishing that operation. *Id.* at 24–25 (citing Ex. 1023, 2:57–65; Ex. 1003 ¶¶ 97–98). Petitioner contends that it was well known that the use of masks to define ranges was computationally efficient and that persons of ordinary skill would have had a reasonable expectation of success in making the combination given that it involved straightforward use of masking techniques. *Id.* at 25–26 (citing Ex. 1003 ¶¶ 99–101).

Patent Owner does not specifically respond to Petitioner's arguments regarding the motivation to combine Biswas and Kumar. *See generally* PO Resp.

We determine that Petitioner has provided sufficiently articulated reasoning with rational underpinnings for the proffered combined teachings of Biswas and Kumar. We are persuaded by Petitioner's declarant's testimony that one of ordinary skill would have known to use the masking techniques exemplified by Kumar to implement the disclosed operation in Biswas of edge routers providing hosts with port number ranges. Ex. 1003

¶¶ 77, 97–101. Accordingly, we determine that Petitioner has proved by a preponderance of the evidence that one of ordinary skill in the art would have been motivated to combine Biswas and Kumar.

4. Independent Claims 7, 10, 11, and 14

For the "method of configuring" preamble of independent claim 7, Petitioner generally relies on the disclosures in Biswas of hosts connected to networks which are configured in response to DHCP requests. Pet. 18–20 (citing Ex. 1022, Fig, 1, 2:23–33, 2:47–3:57, 6:50–60, 7:9–12:19, 12:54–58; Ex. 1003 ¶¶ 79–82).[10]

For claim requirement 7[a] of assigning a primary address,[11] Petitioner relies on the disclosure in Biswas of edge routers providing multiple requesting hosts with the edge router's primary address in response to DHCP requests. Pet. 20–21 (citing Ex. 1022, Fig. 3A, 1:42–45, 2:25–28, 6:50–7:7, 7:62–8:15, 11:50–54; Ex. 1003 ¶¶ 83–86).

For claim requirement 7[b] of assigning a port mask and routing identifier, Petitioner relies on the disclosure in Biswas of edge routers providing requesting hosts with a local address and a global port range in response to DHCP requests and on the disclosure in Kumar of the use of masks to identify port ranges. Pet. 21–24 (citing Ex. 1022, Figs. 3A–3E,

[10] We make no determination that the preamble of claim 7 (or of claims 10, 11, or 14) is limiting.

[11] For economy of presentation, we refer to the portions of claim 7 identified by bracketed letters at Section II.B above, and paraphrase the referenced claim requirement, although the complete language of each claim requirement is the subject of our analysis.

1:32–33, 6:37–7:7, 7:49–61; Ex. 1023, Fig. 7B, 7:31–8:64; Ex. 1003 ¶¶ 87–95).

For claim requirement 7[c] of sending a configuration message, Petitioner relies on the disclosure in Biswas of sending a DHCP reply to a requesting host. Pet. 26–27 (citing Ex. 1022, Fig. 5, 10:22–58; Ex. 1003 ¶¶ 102–104).

Independent claim 10 is an apparatus claim directed to a configuration server that has similar requirements to method claim 7 and additionally requires a processor and communications unit performing the method steps of claim 7. Ex. 1001, 15:27–38. Petitioner's challenge to claim 10 tracks that of claim 7 and further relies on disclosures in Biswas of edge routers that include processors and communication units. Pet. 30 (citing Ex. 1003 ¶¶ 110–113).

Independent claim 11 is a method claim that includes a preamble establishing that a piece of terminal equipment receives a configuration message (tracking the configuration message of claim 7). Ex. 1001, 15:39–44. Claim 11 additionally requires storage of the configuration data of the message, and further requires:

> [B]efore sending a data packet into the telecommunications network, selecting a port number in the range of port numbers defined by the port mask, said data packet comprising as source address the primary address of said piece of terminal equipment and as source port number the selected port number.

Ex. 1001, 15:45–16:6. Independent claim 14 is an apparatus claim counterpart to method claim 11. *Id.* at 16:21–35. Petitioner's challenge to claims 11 and 14 refers to its analysis of claim 7 for the preambles of those

claims, relies on the disclosure in Biswas of memory in hosts for storing data, and further relies on the disclosure in Biswas of hosts sending data by selecting a global address and a port number within the assigned port number range for inclusion in the data packet header. Pet. 30–33, 37–38 (citing Ex. 1022, Fig. 8, 11:25–12:28, 12:40–13:17, 13:45–57; Ex. 1003 ¶¶ 114–119, 132–134).

Patent Owner does not specifically respond to Petitioner's arguments regarding the requirements of independent claims 7, 10, 11, and 14. *See generally* PO Resp.; Reply 2. We determine, having considered and weighed the entirety of the evidence, that Petitioner has proved by a preponderance of the evidence that independent claims 7, 10, 11, and 14 are unpatentable under 35 U.S.C. § 103(a) over the combination of Biswas and Kumar. Furthermore, as discussed above in Section III.D.3, Petitioner persuasively demonstrates that one of ordinary skill would have combined Biswas and Kumar in this manner.

5. Dependent Claims 9, 13, 16, and 17

Claim 9 adds to independent claim 7 the requirement that "said configuration message is further sent to a routing device that routes to said piece of terminal equipment a data packet containing said primary address as the destination address." Ex. 1001, 15:23–26. For the claim 9 requirement, Petitioner relies on the disclosure in Biswas of embodiments that employ a DHCP server that is separate from the edge router, in which the edge router "may be in the form of a customer premises equipment (CPE) that is 'operable as a DHCP relay.'" Pet. 28–29 (quoting Ex. 1022, 8:22–24) (citing Ex. 1022, Fig. 3B, 7:9–10, 8:16–27; Ex. 1003 ¶¶ 108–109).

Claim 13 adds to independent claim 11 the requirement that "on reception of a data packet comprising a destination address, a port number, and a routing identifier, said method further comprises a step of verifying that the port number belongs to the range of port numbers defined by the port mask, and a step of rejecting said packet if result of the verification is negative." Ex. 1001, 16:14–19. For the claim 13 requirement, Petitioner relies, *inter alia*, on the hosts in Biswas being assigned a port range, and argues that therefore one of ordinary skill would have understood that a host would not have used port numbers outside its assigned range. Pet. 37 (citing Ex. 1022, 2:23–33, 2:46–65, 3:6–14; Ex. 1003 ¶ 130). Petitioner further relies on the disclosure in Kumar of the use of rules to block incoming packets, and argues that it would have been obvious to adopt Biswas to use the rule approach of Kumar to reject data packets with port numbers outside the assigned range. *Id.* at 35–36 (citing Ex. 1023, 7:14–38, 8:1–19, 9:1–2; Ex. 1003 ¶¶ 126, 130). Petitioner's argument in support of the combination tracks the argument summarized in Section III.D.3 above: that Biswas does not provide specific implementation details regarding the handling of incoming packets that have non-complying port numbers, and that a person of ordinary skill therefore would have been motivated to adopt the rule approach of Kumar. *Id.* at 36–37 (citing Ex. 1003 ¶¶ 127–131).

Claim 16 requires a "non-transitory computer readable medium encoded with program code instructions executable by a microprocessor to perform the method according to claim 7," and claim 17 correspondingly sets forth the same requirement for claim 11. Ex. 1001, 16:39–44. For these requirements, Petitioner relies on the disclosure in Biswas of computer

implementation details supporting the disclosed embodiments. Pet. 38 (citing Ex. 1022, 3:59–4:4, 13:58–14:16, 17:63–18:21; Ex. 1003 ¶¶ 135–136).

Patent Owner does not specifically respond to Petitioner's arguments regarding dependent claims 9, 13, 16, and 17. *See generally* PO Resp.; Reply 2. We determine, having considered and weighed the entirety of the evidence, that Petitioner has proved by a preponderance of the evidence that claims 9, 13, 16, and 17 are unpatentable under 35 U.S.C. § 103(a) over the combination of Biswas and Kumar.

6. Dependent Claims 8 and 12

Claim 8 adds to independent claim 7 the step of:

> assigning to said piece of terminal equipment an identifier of a routing device adapted to route a data packet comprising said primary address as the destination address to said piece of terminal equipment, and the configuration message further comprising said routing device identifier.

Ex. 1001, 15:16–22. For the claim 8 requirements, Petitioner relies on the disclosure in Biswas of gateway master 110 as the claimed routing device, and the global address of that component as the referenced routing device identifier. Pet. 27–28 (citing Ex. 1003 ¶¶ 105–107). Petitioner cites the statement in Biswas:

> Gateway Master 110 translates local addresses of data received from a private network 108 into global addresses of data being output from the Gateway Master 110 to public network 112, and vice versa. The Gateway Master 110 also translates global addresses of data received from public network 112 into local addresses of data being output from the Gateway Master 110 to private network 108, and vice versa.

Pet. 28 (citing Ex. 1022, 6:12–19). Petitioner asserts that the global address of gateway master 110 is part of the configuration message sent to terminal equipment as part of the DHCP configuration process. Pet. 28 (citing Ex. 1003 ¶¶ 105–106).

Claim 12 adds to independent claim 11 the requirement that "once an identifier of a routing device adapted to route a data packet comprising said primary address as the destination address to said piece of terminal equipment has been received, said method further comprises a step of sending the configuration data to said routing device." Ex. 1001, 16:7–13. For the claim 12 requirement, Petitioner again relies on the disclosure in Biswas of gateway master 110 as the claimed routing device, and attributes the global address of that component as the referenced "identifier of a routing device." Pet. 33–34 (citing Ex. 1022, 6:12–24, 6:61–7:8; Ex. 1003 ¶¶ 120–121). Petitioner asserts that the gateway master is adapted to route data packets to terminal equipment. *Id.* at 34 (citing Ex. 1022, 6:61–7:8). Petitioner argues that a person of ordinary skill in the art would have understood that the configuration data used to send packets to the terminal equipment would have to have been sent to the gateway master. *Id.* (citing Ex. 1003 ¶¶ 122–123).

For claims 8 and 12, Patent Owner argues that, to satisfy the global address requirement of the claims, Petitioner relies on the global address of the Biswas edge router, not that of the gateway master. PO Resp. 17–19. And Patent Owner notes that Petitioner relies on the Biswas gateway master for the claimed routing device. *Id.* at 17. Therefore, argues Patent Owner, Biswas's global address, assigned by the edge router, cannot teach the

claimed "identifier of a routing device" of claims 8 and 12 if, as Petitioner alleges, the routing device is the Biswas gateway master. *Id.* at 19.

Petitioner replies that Patent Owner erroneously analyzes outbound transmissions, whereas claims 8 and 12 are directed to inbound transmissions, because the claims require "a data packet comprising said primary address ***as the destination address*** to said piece of terminal equipment." Reply 2–3. Therefore, argues Petitioner, claims 8 and 12 are limited to data packets entering a private network, and Patent Owner's argument that the Biswas global address identifies the edge router rather than the gateway master is incorrect, insofar as inbound transmissions are concerned. *Id.* at 3–4 (citing Ex. 1039 ¶¶ 3–7, 10). Petitioner relies on its expert to assert that a global address can be used to communicate with the gateway master. *Id.* at 4 (citing Ex. 1039 ¶ 10). Otherwise, argues Petitioner, the gateway master would not receive inbound data packets that use the global address as the destination address. *Id.* at 5 (citing Ex. 1039 ¶ 9).

Patent Owner responds that Petitioner's arguments ignore the fact that the "primary address" in claims 8 and 12 is the same as the "primary destination address" of claims 7 and 11, and that these claims are directed to a "configuration method," not inbound transmissions. Sur-Reply 4–5. The reference to "primary address" in claims 8 and 12, argues Patent Owner, "is only to explain the claimed '[routing device] identifier.'" *Id.* at 5. Moreover, argues Patent Owner, "[w]hether a packet is transmitted inbound or outbound, the global address provided to the terminal device is an

identifier of edge routers . . ., not the global address of the master gateway . . . ." *Id.* (citing Ex. 1022, 6:37–40).

We agree with Patent Owner. The "said primary address" in claims 8 and 12 have as antecedents the "primary destination address" of "a piece of terminal equipment" of claims 7 and 11, respectively. The premise of Petitioner's challenges to claims 8 and 12 is that the global address of the gateway master 110 corresponds to both the "primary address" and the "routing device identifier" referenced in those claims, and that this global address of the gateway master is provided via the DHCP configuration. Pet. 28, 33–34. However, the only global address disclosed in Biswas that is provided to hosts, and thus the only possible candidate for the "primary address" of the claims, is the global address of the edge routers. Ex. 1022, 6:50–60. Likewise, Petitioner assumes, for claim 12, that the gateway master routes data packets to terminal equipment, and therefore it would be apparent that the gateway master had to have the configuration data. Pet. 34. However, it is the edge routers that route data to the terminals, and therefore only those components need the configuration data. With respect to the arrangement in Biswas in which hosts are identified via the global address of an edge router and a port range, the gateway controller plays no role in this process, and does not have any use for the terminal configuration data, any more than do the intermediary routers 106, or the presumably numerous routers in public network 112 and private network 114. *See* Ex. 1022, Fig. 1, 5:43–57. Biswas discloses nothing to suggest that the global address of the gateway master is provided to terminals (as required by claim 8), or that the terminal configuration data is provided to the gateway master (as

required by claim 12). Biswas actually suggests that the disclosed embodiment on which Petitioner relies bypasses the address translation process that otherwise would be performed by the gateway master. *Id.* at 12:22–27.

Accordingly, we determine that Petitioner has not proved by a preponderance of the evidence that claims 8 and 12 are unpatentable under 35 U.S.C. § 103(a) over the combination of Biswas and Kumar.

E. Alleged Obviousness of Claims 1–3, 5, 6, and 15 over Fangman and Kumar or over King and Kumar

Petitioner challenges claims 1–3, 5, 6, and 15 as obvious over the combination of Fangman and Kumar. Pet. 38–53. Petitioner also challenges those claims over the combination of King and Kumar. *Id.* at 53–66. A threshold question for this Decision is whether Fangman or King would have taught or suggested routing data packets by identifying their destination based on a determination of the port range to which the destination port number of a packet belongs. Only if Fangman or King were to do so would the port mask disclosures of Kumar be relevant. As discussed below in Sections III.E.1 and III.E.2, we determine that Petitioner has not proved this by a preponderance of the evidence. Therefore, as set forth in Section III.E.3, there is no basis to combine Kumar with Fangman or King.

1. Whether Fangman Uses Port Ranges As Claimed

Fangman, titled "System And Method For Routing IP Packets," issued June 27, 2006, from an application filed July 11, 2001. Ex. 1024, codes (54), (45), (22). Fangman describes routing packets for IP telephony,

including for IP telephones and service gateways coupled via a network. *Id.* at code (57). When the telephone sends data packets to an external IP device, the service gateway receives the data packet from the telephone, including a private source IP address, source port number, and destination information for an IP device, performs what Fangman refers to as "network address persistent port translation" ("NAPPT") on the data packet, and sends it to the external IP device. *Id.* at code (57), 8:56–58. NAPPT changes the private source IP address to a public source IP address, leaving the source port number unchanged. *Id.* at code (57).

When data packets are sent to the telephone from an external IP device, the service gateway receives a data packet from the IP device, including a public destination IP address, a destination port number, and source information; NAPPTs the data packet, using the public destination IP address and the destination port number to identify the telephone, changing the public destination IP address to the private IP address of the destination telephone, leaving the destination port number unchanged; and sends the data packet to the telephone. Ex. 1024, code (57), 18:31–44. The dispositive issue here is how the private IP address of the destination telephone is identified, and in particular whether that identification involves a determination of the port range to which the destination port number belongs.

a) Petitioner's Initial Challenge

In arguing that the port range is used to identify the telephone when routing packets to the telephone, Petitioner relies on the fact that Fangman discloses that the service gateway allocates a range of port numbers for each

IP telephone connected to it, and maintains a table of "semi-permanent mappings" of the external IP address and ports of each telephone to their internal hosts and ports. Pet. 39–40, 43–45, 48–49 (citing Ex. 1024, Fig. 10B, 3:14–37, 4:17–33, 8:21–32, 8:45–67, 10:66–67, 11:14–15, 18:30–57, 30:12–23; Ex. 1003 ¶¶ 140–143, 152–153, 166); Reply 11–12 (citing Ex. 1039 ¶ 16). The particular port number used in any given data transmission is limited to the port number range assigned to the telephone. Ex. 1024, 18: 35–36, 18:48–52. Petitioner argues that:

> [A] POSITA would have understood that the service gateway 170 consults its mapping table to determine "the assigned range of port numbers" to which the "destination port number" in the IP packet belongs, and then replaces the public IP address in the received packet with the private IP address for the IP telephone that is associated with that range of port numbers."

Pet. 44 (citing Ex.1024, 4:17–33, 18:31–47; Ex. 1003 ¶ 153).

b) Patent Owner's Response

In response, Patent Owner argues that "Fangman does not teach using port ranges or port masks to route packets to a destination device, as required by claims 1–5, 6, and 15 . . . ." PO Resp. 20. Patent Owner argues that although, during initial setup of connecting an IP telephone to the system, the service gateway assigns a range of port numbers to the telephone, there is only a brief discussion of how packets received at the service gateway during an incoming telephone call are handled. *Id.* at 21–22 (citing Ex. 1024, 18:31–47; Ex. 2014 ¶ 79). That discussion describes the NAPPT process, and merely states that "the destination port number may be used to uniquely identify the IP telephone," but does not indicate that the

identification involves a determination of the port range to which the destination port number belongs. *Id.* As stated in Fangman, "[p]erforming a NAPPT on the data packet may include using the public destination IP address and the destination port number to uniquely identify the IP telephone." Ex. 1024, 18:39–41. Thus, Patent Owner argues, Fangman uses the port number, not the port range, to uniquely identify the telephone. *Id.* at 22–23 (citing Ex. 2014 ¶¶ 79–81).

Patent Owner further argues that Petitioner incorrectly relies on irrelevant portions of Fangman that describe initial setup or the treatment of outgoing packets, that involve source addresses and ports, rather than the relevant disclosures regarding incoming packets involving destination addresses and ports. PO Resp. 23 (citing Ex. 2014 ¶¶ 82–84). For example, Patent Owner argues that the allocation of a port range as the telephone "acquires its lease during a DHCP process," or the use of the "table of semipermanent mapping" of port ranges to internal addresses to validate that the telephone is using a correct port number, do not relate to the NAPPT process for incoming packets. *Id.* at 23–24 (citing Ex. 2014 ¶¶ 83–85). Patent Owner asserts that, in handling incoming packets, Fangman only states, "[p]erforming a NAPPT on the data packet may include using the public destination IP address and ***the destination port number*** to uniquely identify the IP telephone **120**," thus confirming that Fangman uses only a port number in NAPPT for a destination packet. *Id.* at 25 (citing Ex. 1024, 18:39–42; Ex. 2014 ¶ 86).

c) Petitioner's Reply

In its Reply, Petitioner argues that one of ordinary skill would have known that the only practical way to handle incoming packets would be use the table of semi-permanent mappings of the external IP address and ports to the internal hosts and ports, which table would associate the private address with the corresponding public address and assigned port range. Reply 5–6 (citing Ex. 1024, 8:49–51; Ex. 1039 ¶¶ 16, 19, 23). Petitioner argues that the "traditional NAT" approach that Patent Owner assumes for incoming packets would not work because an incoming call to a telephone would not necessarily be preceded by a corresponding outgoing call from that telephone, in which case there would be no entry in the NAT table for the that telephone. *Id.* at 7, 9–11 (citing Ex. 1024, 2:54–65; Ex. 1039 ¶¶ 11–21). Petitioner recognizes one possible way to avoid this alleged flaw in Patent Owner's version of handling incoming packets — using a table with an entry for every port number in the port range assigned to each telephone — but, argues Petitioner, this would result in impractically large tables, and would be redundant given that the "service gateway is already 'maintain[ing] a table of semi-permanent mappings of the external IP address and ports to the internal hosts and ports.'" *Id.* at 7–9, 13, 15–17 (citing Ex. 1024, 8:49–51, Ex. 1039 ¶¶ 21–23).

Further in its Reply, Petitioner also relies on claim 1 of Fangman, which includes storing a data structure that includes "the assigned ports for the IP telephone," which Petitioner interprets as teaching using a port-range table. Reply 8, 16 (citing Ex. 1024, 32:48–57; Ex. 1039 ¶¶ 22–23). Petitioner also relies on a separate component — a media gateway controller

— which during setup operations "use[s] the public IP address and the port range to determine the private IP address, for example, by using look-up tables." *Id.* at 12–13 (citing Ex. 1024, 3:53–64). Further, in response to Patent Owner's reliance on the statement in Fangman that it uses "the destination port number to uniquely identify the IP telephone," Petitioner argues that this statement does not mean that the port number is relied on exclusively, but rather is used in comparing it to the port range, which in turn achieves the identification. *Id.* at 14 (citing Ex. 1039 ¶ 20).

Finally, Petitioner argues that even if Fangman were interpreted to be using individual port numbers rather than port ranges for the incoming NAPPT process, it would nevertheless have been obvious to instead use port ranges. Reply 9, 16 (citing Ex. 1039 ¶¶ 22–23).

d) Patent Owner's Sur-Reply

In its Sur-Reply, Patent Owner disputes Petitioner's assertion that port ranges must be used in order to handle "unsolicited packets." Sur-Reply 6. Instead, Patent Owner argues that, during initialization, each telephone in use maps its internal IP address to a port number selected from its assigned range, which association is stored in a NAPPT table for use in subsequent calls, and therefore the only entries in the table are port numbers that are actually used, not every port number in the assigned ranges. *Id.* at 7–8 (citing Ex. 2015 ¶ 12).[12] In support of its argument, Patent Owner sets out in detail the processes disclosed in Fangman. *Id.* at 8–12.

[12] As stated above, Exhibit 2015 is an additional declaration by Patent Owner's expert, Mr. Minoli, submitted with the Sur-Reply. Patent Owner

This includes a registration process, in which each telephone in use registers with the media gateway controller, via its service gateway, providing the media gateway controller with a specific port number for each telephone selected from the port range assigned to it, which port number and its association with the corresponding public IP address is stored at the media gateway controller. *Id.* at 8–10 (citing Ex. 1024, Figs. 6A–6C, 8:45–57, 16:21–27, 21:2–6, 21:12–16, 21:23–33, 22:24–60; Ex. 2015 ¶¶ 8–12). Patent Owner submits that this registration process illustrates that:

> [B]efore the IP telephone can even send or receive a call, it must register a port number with the MGC and sending an outgoing packet with the port number through the SG. EX2015 ¶12. Since NAPPT requires "maintain[ing] a table of semi-permanent mappings of the external IP address and ports to the internal hosts and ports," there is no teaching that suggest[s] instead maintaining a mapping of port ranges.

Sur-Reply 10–11 (citing Ex. 1024, 8:49–51; Ex. 2015 ¶¶ 11–12).

The Fangman processes on which Patent Owner relies also include a call setup process, in which a port number is again selected for the telephone initiating the call, selected from the port range assigned to that telephone, and that port number is provided to the media gateway controller. *See* Ex. 1024, Figs. 7A–7C, 8:49–57, 23:36–44, 24:26–34, 25:11–22; *see also* Sur-Reply 11; Ex. 2015 ¶ 10.

In addition, Patent Owner relies on the disclosed "IP Telephone to External IP Telephone RTP Flow" process, in which the port numbers for

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moved for leave to submit this declaration, which motion was unopposed. Paper 21; Ex. 3003. Therefore, the motion is hereby granted.

the sending and receiving telephones that were provided to the media gateway controller during call setup are used to make the call. Sur-Reply 11–12 (citing Ex. 1024, Figs. 10A–10B, 28:51–56, 29:1–14; Ex. 2015 ¶¶ 11–12). Patent Owner asserts that this process "illustrate[s] the destination information for the second phone is the same information selected during the second phone's registration process, not some random port number falling withing a prescribed range, and that single port number is used throughout the transmission process." *Id.* at 12. Patent Owner summarizes, "Thus, in every embodiment described by Fangman, a single port number is assigned for all phones involved and stored in the respective service gateways' NAPPT tables before a packet is ever received by a phone." *Id.*

Based on these disclosures in Fangman regarding use of port numbers, Patent Owner argues that Fangman's NAPPTing process involves maintaining a table of semi-permanent mappings that associates external IP address and ports to the internal hosts and ports, not port ranges. Sur-Reply 12–14 (citing Ex. 1024, 1:36–67, 2:5–10, 4:13–17, 4:29–33, 8:49–58; Ex. 2015 ¶ 12). In addition, argues Patent Owner, these disclosures demonstrate that Petitioner's assertion that the use of port ranges would be required in order to account for "unsolicited transmissions" is without merit, as is Petitioner's reliance on irrelevant aspects of the media gateway controller. *Id.* at 14–17 (citing Ex. 1024, Figs. 10A–10B, 4:18–33, 8:45–67, 29:7–14, 32:35–57; Ex. 2015 ¶¶ 10–12).

Finally, Patent Owner argues that Petitioner's assertion, that it would have been obvious to use port ranges that even if Fangman only used

individual port numbers, is untimely, based on unsupported hindsight, and inconsistent with Fangman's explicit disclosures. Sur-Reply 17–18.

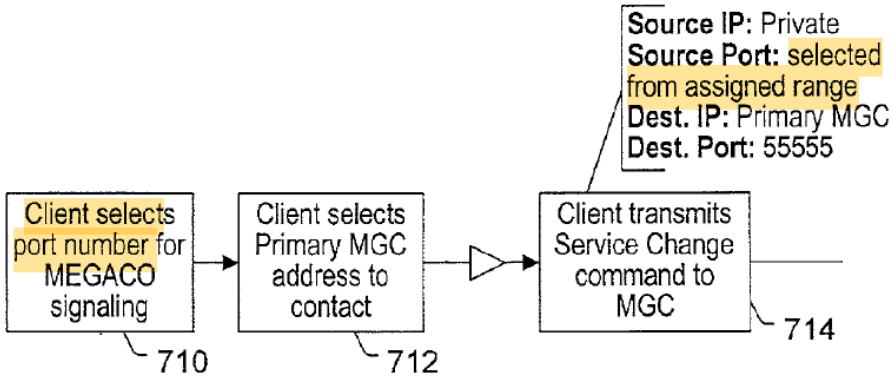
e) Petitioner's Supplemental Brief

In an authorized supplemental brief responding to Patent Owner's Sur-Reply, Petitioner argues that positions set forth in the Sur-Reply contradicted Patent Owner's assertion in its initial response that Fangman's NAPPT worked identically to traditional NAT, which required that outgoing transmissions precede incoming transmissions. Supp.Br. 1–2. Petitioner also argues that Patent Owner's focus on the media gateway controller is misplaced, because it is the service gateway that stores the range of port numbers assigned to the telephone, and there is no disclosure that the service gateway stores individual port numbers during the registration process. *Id.* (citing Ex.1024, 3:25–37, 3:53–64, 8:21–31,11:14, 18:47–56, 20:53–55, 21:1–23:18). Petitioner argues that the service gateway is already performing NAPPT during the registration process itself, before the telephone has registered its port numbers with the media gateway controller. *Id.* at 2 (citing Ex.1024, 21:55–63).

f) Analysis

As part of the initial DHCP process, the service gateway assigns a port range to the telephone and associates that range with the private IP address of the telephone, which information is stored at the Service Gateway in a "perpetual . . . table" and at the telephone. Ex. 1024, 3:14–17, 3:34–36, 11:14, 14:12–14, 20:53–55. Fangman states that the service gateway "may facilitate and mediate the IP telephony process by assigning a range of ports to a client IP telephone . . . ." *Id.* at 18:47–50.

As discussed above, Fangman discloses that, during registration and call setup, the media gateway controller is provided with a specific port number for each telephone selected from that telephone's assigned port range. This is illustrated in the portion of Figure 7A reproduced below (highlighting applied).



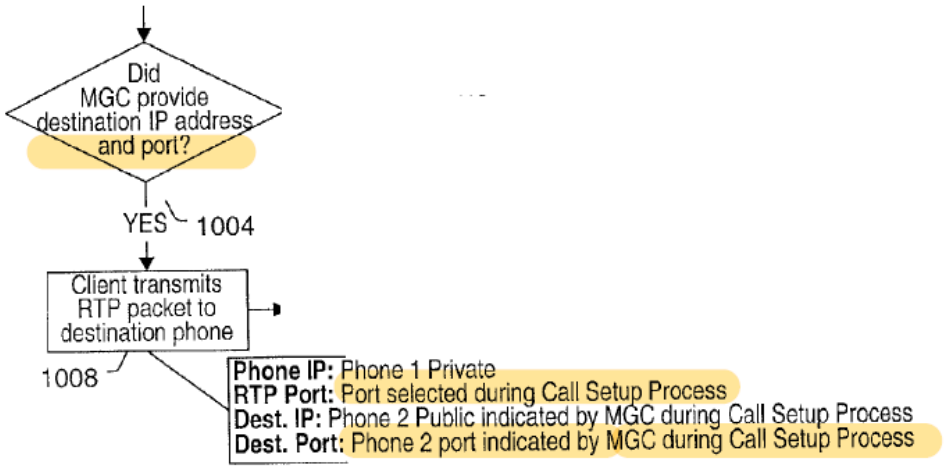
This portion of Figure 7A is explained in Fangman:

> [I]n step 710 the client may select a port number for . . . signaling. In the preferred embodiment, the port number may be selected from the range of port numbers assigned to the IP telephone client in the DHCP lease negotiation process . . . .
>
> In step 712 the client may select a primary MGC [media gate controller] address to contact, and in step 714, may transmit a Service Change command to the MGC 150. An example packet header is shown as part of 714, comprising a source IP address, denoted as Private, a source port, selected from the assigned port range, as indicated, a destination IP address, here shown as the Primary MGC address, and a destination port . . . .

Ex. 1024, 23:46–59. Based on these registration and setup processes, the Service Gateway maintains a table of "semi-permanent mappings of the external IP address and ports to the internal hosts and ports."

Id. at 8:49–51. This is in contrast to the above-mentioned "perpetual table" that stores port ranges.

Then, during a call between two phones, those stored port numbers, not the port ranges, are used to identify the private IP addresses of the phones. This is illustrated in the portion of Figure 10A reproduced below (highlighting applied).



This portion of Figure 10A is explained in Fangman:

> In step 1004 the system may determine if the MGC 150 provided a destination IP address and port . . . . If the MGC 150 did provide a destination IP address and port, then in step 1008, the client may transmit an RTP packet to the destination telephone, i.e., IP telephone 120C. In one embodiment, the packet header for the data now may include the source IP address set to Phone 1 Private, the RTP port set to the port selected during the Call Setup process, the destination IP address, set to Phone 2 Public indicated by the MGC during the Call Setup process, and the destination port, set to Phone 2 port indicated by the MGC during the Call Setup process.

Ex. 1024, 29:1–16.

This disclosure is inconsistent with any suggestion that the Fangman system, when routing a telephone call to its destination, identifies the private IP address of the destination telephone by determining the port range to which the port number of the destination telephone belongs. When Fangman describes the NAPPT process, it does not indicate that port ranges are used, but rather repeatedly states that port numbers are used:

> The [service gateway] receives a data packet from the IP device, including a public destination IP address . . . a destination port number . . . and source information, NAPPTs the data packet, using the [public destination IP address] and the [destination port number] to identify the [IP telephone] . . . .

Ex. 1024, code (57).

> Performing NAPPT on the data packet received from the destination may include using the public destination IP address and the destination port number to uniquely identify the IP telephone, and changing the public destination IP address to a private source IP address of the IP telephone while leaving the destination port number unchanged.

Ex. 1024, 4:28–33.

> The SG 170 may maintain a table of semi-permanent mappings of the external IP address and ports to the internal hosts and ports.

Ex. 1024, 8:49–51.

> Performing a NAPPT on the data packet may include using the public destination IP address and the destination port number to uniquely identify the IP telephone 120, and changing the public destination IP address to a private destination IP address while leaving the destination port number unchanged.

Ex. 1024, 18:39–44.

Petitioner particularly relies on Fangman claim 1. Reply 8. However, claim 1 refers to storing "the assigned ports," not the "range of port umbers." Sur-Reply 16 (citing Ex. 1024, 32:55).

Accordingly, we determine that Petitioner has not proved by a preponderance of the evidence that Fangman discloses that the port range is used to identify the telephone when routing packets to the telephone. We also agree with Patent Owner that Petitioner's conclusory assertion that the use of port ranges as claimed would have been obvious in light of Fangman is insufficiently supported.

2. Whether King Uses Port Ranges As Claimed

King, titled "Apparatus And Method For Providing Data Session Source Device Information," issued October 4, 2011, from an application filed May 23, 2006. Ex. 1025, codes (54), (45), (22). King discloses a network in which source devices send data packets to remote devices via customer premises equipment and aggregation devices. *Id.* at Fig. 1, 1:34–49, 2:49–51. Each device is assigned a range of port numbers, and a table associating source device identifiers with the port number range is stored at the aggregation device. *Id.* at Fig. 7, 5:36–42. During transmission of outgoing packets, the aggregation device determines which port number range the port number in the header of a transmitted data packet belongs to, and from that identifies the source device for purposes of determining policy information such as authorization, authentication and accounting information. *Id.* at Figs. 2, 7, 8, 1:49–66, 5:23–57, 5:60–6:20.

a) Petitioner's Initial Challenge

In arguing that the port range is used to identify a user device when routing packets to the device, Petitioner asserts that incoming packets (i.e., packets that are sent from a remote device to a user device) "can then be classified" based on the assigned port range. Pet. 55 (citing Ex. 1025, Fig. 7, 5:36–57; Ex. 1003 ¶ 185). Petitioner relies on the disclosure of a database that associates the port number ranges assigned to devices with the source address of the device. *Id.* at 58, 61 (citing Ex. 1025, Fig. 7, 5:28–57; Ex. 1003 ¶¶ 193–203). Petitioner asserts that this database is stored at both the customer premises equipment and the aggregation device. *Id.* at 58 (citing Ex. 1025, 4:23–24, 5:36–65). Petitioner argues that "King explains, on receipt of the data packet, that 'incoming packets can then be classified . . . based on source port range.'" *Id.* (citing Ex. 1025, 5:26–46). Petitioner also relies on the fact that "the aggregation device derives the data session [user] device information in the form of the original source or user device IP address , , , from the table at FIG7 based on the range in which the received TCP port number falls . . . ." *Id.* at 62 (citing Ex. 1025, Fig. 8, 6:5–11).

b) Patent Owner's Response

Patent Owner challenges Petitioner's analysis of King as flawed because Petitioner "conflates source port processing with destination port processing," and improperly tries to extend King's method to obtain a "policy" to apply to a method of routing a packet. PO Resp. 28. Patent Owner argues that King's only disclosed use of port ranges is for outgoing packets, in which the aggregation device identifies the source device by using its stored table to "identify a user device and use that identification to

obtain policy information from an AAA [authentication and accounting] server." *Id.* at 29–30 (citing Ex. 1025, Figs. 1, 6, 7, 1:28–59, 5:51–57, 5:63–65; Ex. 2014 ¶¶ 95–96). Patent Owner asserts that the King system never uses the destination port to identify a port range associated with a device during the reverse process of sending a packet to the device. *Id.* at 30 (citing Ex. 2014 ¶ 97). Patent Owner points out that the portions of King on which Petitioner relies all deal with handling outgoing packets and source ports rather than destination ports. *Id.* at 30–31 (citing Ex. 2014 ¶¶ 98–99).[13]

c) Petitioner's Reply

Petitioner argues in reply that one of ordinary skill would have known that King's outbound disclosures could have also been applied to routing inbound transmissions. Reply 20 (citing Ex. 1039 ¶¶ 25–29). Petitioner argues that using the port range to identify a device would have involved a "trivial" coding change. *Id.* at 20–21 (citing Ex. 1039 ¶ 26). Petitioner cites the discussion in King of the prior art Port Address Translation process, which involved both outbound and inbound packets, and the fact that King discloses a replacement for that process. *Id.* at 21 (citing Ex. 1025, 2:62–3:6, 3:47–50, 3:67–4:2, 5:33–35; Ex. 1039 ¶ 27). From this, Petitioner argues that one of ordinary skill would have known to apply the port range identification technique of King to inbound as well as outbound packets. *Id.* (citing Ex. 1039 ¶ 27).

[13] Patent Owner also argues that Petitioner has not shown that King teaches the claim requirement that packets are routed to their destination based on an identifier. PO Resp. 31–33. It is not necessary for this Decision to address this argument.

Petitioner also cites the fact that King states that "'[t]he aggregation device obtains [and] applies a policy to communication between the user device and the Internet' — not just from the user device to the Internet," and argues that this means that the aggregation device uses port ranges to identify destination devices in order to apply policies to incoming packets. Reply 21–22 (citing Ex. 1025, 1:21–33, 3:53–59). In addition, Petitioner argues that the most efficient way for the aggregation device to route incoming packets to the proper destination device would have been to use King's port-range disclosure. *Id.* at 22 (citing Ex. 1025, 1:25–28, 2:13–39, 3:53–59; Ex. 1039 ¶ 28). Petitioner also argues that Patent Owner does not explain how an aggregation device could route an inbound data packet to a user device without determining the user device's private address using its assigned port range, given that the aggregation device may be servicing multiple instances of customer premises equipment. *Id.* at 22–23 (citing Ex. 1039 ¶ 29).

d) Patent Owner's Sur-Reply

In its Sur-Reply, Patent Owner argues that King is directed to an aggregation device identifying subscriber information of the source device that is sending outbound packets, and there would be no need to do this for a subsequent return packet. Sur-Reply 20 (citing Ex. 2015 ¶¶ 13–14). Patent Owner explains that the aggregation device only needs to identify a source device during initial authorization, after which multiple data sessions with different remote devices continue without additional authorization, and thus the ongoing sending and receiving of data does not need to use port ranges to route the data packets. *Id.* at 20–21 (citing Ex. 1025, 1:28–33, 1:36–39,

1:55–59, 4:34–35; Ex. 2015 ¶¶ 13–14). In response to Petitioner's argument that one of ordinary skill would be motivated to use King's port-range disclosure to route inbound data packets rather than implementing the prior art NAT approach, Patent Owner argues that King's use of port ranges is only for the purpose of enabling the aggregation device to identify subscribers to apply policies at the initiation stage. *Id.* at 21–22 (citing Ex. 1025, 2:47–48, 6:58–61; Ex. 2015 ¶¶ 15–16). Patent Owner submits that King's description of how the customer premises equipment routes data packets using the prior art NAT approach confirms that the routing process does not use port ranges to identify devices — that is only done in the aggregation device to apply policies. *Id.* at 22–23 (citing Ex. 1025, 2:3–4, 2:49–61, 2:65–3:1, 3:42–52, 5:22–35, 5:67–6:2, 6:58–61; Ex. 2015 ¶¶ 13–15).

e) Petitioner's Supplemental Brief

Petitioner argues that the fact that King teaches the claim limitation at issue by describing modifying the conventional process for incoming packets such that translation is carried out to separate port ranges per host device. Supp.Br. 3 (citing Ex. 1025, 5:32–35; Ex. 2015 ¶ 15). Petitioner also argues that Patent Owner has failed to explain how the aggregation device, if it is not using port ranges to identify devices, would route incoming packets if it was connected to multiple instances of customer premises equipment. *Id.* at 3–4 (citing Ex. 1025, 2:29–34). Petitioner also disputes Patent Owner's argument that the aggregation device only applies policies to outbound packets, because policies such as applying parental

content control would apply to inbound packets. *Id.* at 4 (citing Ex. 1025, 3:53–59).

f) Analysis

In King, for a given data transmission session, a user device is assigned a port number from a pool of port numbers stored in a database and associated with the device. Ex. 1025, Fig. 7, 5:36–42. This database is stored at the aggregation device. *Id.* at 4:23–24. Figure 7 is an example of such a table, reproduced below.

SOURCE ADDRESS	TCP PORT	USER DEVICE
IPCPE	1024-1039	IP1'
IPCPE	1040-1055	1P2'

FIG. 7

Figure 7 is a table stored at an aggregation device that is used, in this example, to identify a packet with source address "IPCPE" and port number in the range 1024 to 1039 with address "IP1" of one user device, and identify a packet with source address IPCPE and port number in the range 1040 to 1055 with address "IP2" of a second user device. Ex. 1025, 4:23–24, 5:36–51. At the start of the session, the aggregation device uses the port number to identify the address of the device in order to determine information about the device, such as authorization, authentication and accounting policies. *Id.* at 1:49–55. In doing so, it determines the user device identity based on the port range that the port number belongs to, using the database of assigned ports. *Id.* at 5:36–57.

However, there is no disclosure in King of using port ranges for routing of data packets to user devices. The customer premises equipment, which performs the routing function, stores a different table, an example of which is illustrated in Figure 6 reproduced below.

CONNECTION 400	INPUT PORT 402	INPUT SOURCE ADDRESS 404	OUTPUT PORT 600	OUTPUT SOURCE ADDRESS 408
100-102	1024	IP1	1024	IPCPE
118-102	1024	IP2	1040	IPCPE
100-116	1025	IP1	1025	IPCPE
118-116	1025	IP2	1041	IPCPE

FIG. 6

Figure 6 is a table showing assignment at a customer premises equipment of dedicated source port numbers, so that incoming packets with address IPCPE are routed to device IP1 or device IP2 depending on the assigned port number in column 600. Ex. 1025, 4:21–22, 5:13–35. Although each device uses port numbers within an assigned range, that range is not used to identify the device during routing — instead this table is used. *Id.*

Petitioner mischaracterizes the disclosure in King when it quotes, "At the service aggregation device . . . incoming packets can then be classified by a component to IP sessions based on source port range." Pet. 58 (citing Ex. 1025, 5:36–57). Petitioner would have it that this refers to incoming packets in traffic returning from remote devices to internal devices. Not so — in context it is clear that this refers to ***outgoing*** packets from internal devices to remote devices, passing through the aggregation device. The

packets are "incoming" only in the sense that they are entering the aggregation device during this outgoing transmission.

It makes no sense for Petitioner to be speculating about imposing parental controls on packets incoming from external devices. Supp.Br. 4. Petitioner ignores the fact that King's aggregation device uses port ranges to identify devices in order to apply policies to those devices, which is done during an initial setup process, not repeated for each packet. *See* Ex. 1025, 1:28–59. King's aggregation device is not applying policies to ongoing packets, but rather to the internal user devices on initialization.

Petitioner raises a straw man in questioning how an aggregation device routes an inbound data packet to a user device without determining the user device's private address using its assigned port range, given that the aggregation device may be servicing multiple instances of customer premises equipment. Reply 22–23. It is the customer premises equipment that routes an inbound data packet to an internal user device. Petitioner's question about the aggregation device is no more pertinent than asking the same question about the "further aggregation devices and/or Internet core devices" that incoming packets also must traverse, as disclosed in King. Ex. 1025, Fig. 1, 1:47–48.

In sum, none of Petitioner's arguments to the contrary stand up to scrutiny in light of these straightforward facts. Based on this record, we determine that the preponderance of the evidence does not prove that King teaches or suggests that the port range is used to identify devices when routing packets to the device.

3. The Combination of Fangman and Kumar, and of King and Kumar

Using arguments similar to the above-discussed arguments regarding the combination of Biswas with Kumar, Petitioner argues that one of ordinary skill would have been motivated to apply the use of masks to define port number ranges, as disclosed in Kumar, in order to implement the disclosed operation in Fangman and King of assigning port ranges to hosts. Pet. 41, 45–47, 55–56, 59–60 (citing Ex. 1003 ¶¶ 144, 156–162, 186, 195–201).

However, each of claims 1–3, 5, 6, and 15, directly or via dependency, requires, as part of the process of routing an IP data packet that includes a destination port number, "determining [or a processor that determines] a port mask assigned to the destination equipment, the port mask defining a range of port numbers to which the destination port number belongs," and then using that port mask to select the identifier of the equipment. Ex. 1001, 14:14–15:2. The premise of Petitioner's challenges for the Fangman/Kumar and the King/Kumar combinations is that Fangman and King disclose determining and using a port number range in the manner claimed, and Petitioner applies Kumar to fill in the implementation detail of using a port mask to define the range. Pet. 45, 58–59.

But, for the reasons stated above in Sections III.E.1 and III.E.2, Petitioner has not proved by a preponderance of the evidence that Fangman or King teaches or suggests routing data packets sent by a terminal equipment by determining a port range assigned to that equipment. Therefore, we are not persuaded that there is any basis for asserting that a person of ordinary skill would have turned to Kumar to use masks to

implement using a port number range to route data packets, because it has not been shown that Fangman or King uses port number ranges to route data packets in the first place.

Accordingly, we determine that Petitioner has not proved by a preponderance of the evidence that claims 1–3, 5, 6, and 15 are unpatentable under 35 U.S.C. § 103 over the combination of Fangman and Kumar, or of King and Kumar.

F. Alleged Obviousness of Claim 4 over Fangman, Kumar, and RFC 791 or over King, Kumar, and RFC 791

Petitioner challenges claim 4 over the combination of Fangman, Kumar, and RFC 791, and alternatively over the combination of King, Kumar, and RFC 791. Pet. 66–70. Claim 4 adds to claim 1 the requirement that "the at least one identifier is a route identifier specific to said destination equipment and the packet is routed based on said specific route identifier." Ex. 1001, 14:37–40. For this requirement, Petitioner relies on the disclosure in RFC 791 of a "strict source routing" option. Pet. 67–70. However, given our determination set forth above in Section III.E regarding claim 1, we determine that Petitioner has not proved by a preponderance of the evidence that claim 4 is unpatentable under 35 U.S.C. § 103 over the combination of Fangman, Kumar, and RFC 791, or over the combination of King, Kumar, and RFC 791.

IV. CONCLUSION[14]

For the foregoing reasons, we are persuaded that Petitioner establishes by a preponderance of the evidence that claims 7, 9–11, 13, 14, 16, and 17 of the '369 patent have been shown to be unpatentable, but that claims 1–6, 8, 12, and 15 have not been shown to be unpatentable.

In summary:

Claims	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
7–14, 16, 17	103	Biswas, Kumar	7, 9–11, 13, 14, 16, 17	8, 12
1–3, 5, 6, 15	103	Fangman, Kumar		1–3, 5, 6, 15
1–3, 5, 6, 15	103	King, Kumar		1–3, 5, 6, 15
4	103	Fangman, Kumar, RFC791		4
4	103	King, Kumar, RFC791		4
Overall Outcome			7, 9–11, 13, 14, 16, 17	1–6, 8, 12, 15

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

V. ORDER

In consideration of the foregoing, it is hereby

ORDERED that Patent Owner' unopposed motion for leave to submit the declaration by Patent Owner's expert filed with its Sur-Reply is granted;

FURTHER ORDERED that claims 7, 9–11, 13, 14, 16, and 17 of U.S. Patent No. 8,693,369 B2 have been shown to be unpatentable under 35 U.S.C. § 103;

FURTHER ORDERED that claims 1–6, 8, 12, and 15 of U.S. Patent No. 8,693,369 B2 have not been shown to be unpatentable under 35 U.S.C. § 103; and

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

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