

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

WSOU INVESTMENTS, LLC D/B/A
BRAZOS LICENSING AND DEVELOPMENT,
Patent Owner.

IPR2021-00538
Patent 7,596,140 B2

Before THU A. DANG, BRIAN J. McNAMARA, and
JOHN D. HAMANN, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable

I. INTRODUCTION

A. *Background*

In response to a Petition (Paper 2, “Pet.”) filed by Juniper Networks, Inc. (“Petitioner”), we instituted *inter partes* review of claims 1–7, 13, 15–19, 21–25, 31, and 33–38 (the “challenged claims”) of U.S. Patent No. 7,596,140 (Ex. 1001, “the ’140 patent”). See Paper 9 (“Dec. Inst.”). During the trial, WSOU Investments, LLC d/b/a Brazos Licensing and Development (“Patent Owner”) filed a Response (Paper 12, “PO Resp.”), to which Petitioner filed a Reply (Paper 15, “Pet. Reply.”). In turn, Patent Owner filed a Sur-Reply. Paper 16 (“PO Sur-Reply”). An oral hearing was held with the parties on May 18, 2022. A transcript of the hearing has been entered into the record. Paper 20 (“Tr.”)

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, Petitioner has shown by a preponderance of the evidence that claims 1–7, 13, 15–19, 21–25, 31, and 33–38 of the ’140 patent are unpatentable.

B. *The ’140 Patent*

The ’140 patent, titled “Methods and Devices for Creating Bi-Directional LSPS,” issued on September 29, 2009, from Application No. 10/613,104, with a filing date of July 7, 2003. Ex. 1001, codes (54), (45), (21), (22). The ’140 patent provides a bi-directional Label Switched Path (LSP) that is created by bundling forward and backward LSPs. *Id.* at code (57). Bundling is carried out by creating an LSP in one direction (e.g., forward path) and then creating a separately generated LSP in the opposite direction (backward path). *Id.* at 1:30–36.

In one embodiment, a network device generates and sends a backward path request message to a source of a separately generated initial forward path request message. *Id.* at 1:38–45. After sending the backward path request message, the network device awaits the receipt of a backward path reservation message from the source, and upon receiving this backward path reservation message, an LSP in the backward direction is established. *Id.* Having separately generated and established both a forward and a backward LSP, the two LSPs will act as a bi-directional LSP between the network device and the source. *Id.*

An illustration of the embodiment of the '140 patent's bi-directional LSP is depicted in Figure 1B, reproduced below:

FIG. 1B

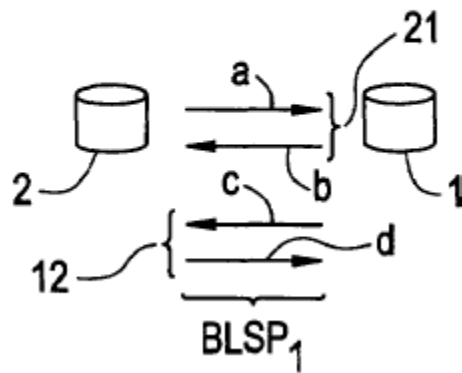


Figure 1B shows an example of a bi-directional LSP (BLSP₁) provided between network device 2 operating as a source device and network device 1 operating as a destination device. *Id.* at 2:22–25. As shown in Figure 1B, BLSP₁ comprises forward LSP 21 and backward LSP 12. *Id.* at 2:25–27.

In the embodiment shown in Figure 1B, to create BLSP₁, source device 2 generates and sends initial, forward path request message *a* to

destination device 1 in order to initiate the establishment of a forward LSP. *Id.* at 2:36–40. Upon receiving forward path request message *a*, destination device 1 generates and sends reservation message *b* to source device 2, wherein forward LSP 21 is created between source device 2 and destination device 1. *Id.* at 2:40–44.

Forward path request message *a* contains “backward path parameters” used by destination device 1 to initiate the creation of a backward LSP, wherein destination device 1 uses the backward path parameters to generate and send backward path request message *c* to source device 2. *Id.* at 2:45–51. Upon reception of backward path reservation message *d* by destination device 1, backward LSP 12 is created. *Id.* at 2:58–60.

C. The Challenged Claims

Of the challenged claims, claims 1, 16, 21, and 34 are independent. Independent claim 1 is illustrative of the challenged claims, and is reproduced below:

1. A network device operable to:

by itself generate and send in a transmission section a backward path request message to a source of a separately generated, initial forward path request message associated with a forward Label Switched Path (LSP) between the device and the source; and

receive in a receiving section a backward path reservation message from the source in order to establish a backward LSP between the device and the source, wherein the separately established forward and backward LSPs form a bi-directional LSP between the device and the source.

Ex. 1001, 4:27–37.

D. Asserted Grounds of Unpatentability

We instituted *inter partes* review of all claims and on all grounds in the Petition. Petitioner asserts that claims 1–7, 13, 15–19, 21–25, 31, and 33–38 of the ’140 are unpatentable on the following grounds (Pet. 7):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–7, 13, 15–19, 21–25, 31, 33–38	102	Lewis ¹
1–7, 13, 15–19, 21–25, 31, 33–38	103	Lewis
3, 4, 6, 23, 24	103	Lewis, Shankar ²

Petitioner relies on the Declaration of Dr. Jon Weissman, Ph.D. (Ex. 1003) in support of its unpatentability contentions.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Relying on the declaration of Dr. Weissman, Petitioner contends that

A [person of ordinary skill] in the art related to the ’140 patent would possess a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field (or its equivalent), plus at least two years of experience working in networking environments, including at least some

¹ U.S. Patent Application Publication No. 2004/0004955 A1, published January 8, 2004, filed March 18, 2003 (Ex. 1004, “Lewis”).

² U.S. Patent Application Publication No. 2003/0174706 A1, published September 18, 2003, filed March 4, 2003 (Ex. 1005, “Shankar”).

experience with networking protocols and network routing. Additional graduate education could substitute for professional experience, while significant experience in the field might substitute for formal education.

Pet. 18 (citing Ex. 1003 ¶33).

Patent Owner replies that it “does not offer a competing definition,” because “Petitioner would still not meet its burden to prove unpatentability of any challenged claim.” PO Resp. 4.

We adopt and apply Petitioner’s definition of a person of ordinary skill in the art (“POSITA”) at the time of the claimed invention because, based on the record, this proposal appears to be consistent with the ’140 patent, the asserted prior art, and is supported by the testimony of Dr. Weissman.

B. Claim Construction

We construe each claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b) (2020). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by POSITA at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) (“*Phillips*”).

Petitioner points out that “neither party has proposed claim constructions for the ’140 patent in the co-pending district court litigation,” and thus contends that “no construction for these terms is necessary because the claims encompass the prior-art mappings under any construction consistent with *Phillips*.” Pet. 19. Patent Owner does not propose any claim construction. See PO Resp. 4–5.

We determine that it is unnecessary to construe any claim term expressly to resolve the disputed issues before us. To the extent the parties' arguments about whether the prior art teaches the claimed subject implicate issues of claim interpretation, those matters are addressed in our merits analysis below. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms that . . . are in controversy, and only to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. Claims 1–7, 13, 15–19, 21–25, 31, and 33–38

Petitioner contends that claims 1–7, 13, 15–19, 21–25, 31, and 33–38 of the '140 patent are anticipated by or at least would have been obvious in view of Lewis. Pet. 27–58. In response, Patent Owner contends that Petitioner fails to meet its burden of presenting anticipation or obviousness of the challenged claims. PO Resp. 4–13.

1. Principles of Law

Petitioner bears the burden of establishing the unpatentability of any claim by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). There is no requirement that the prior art must use the same words to describe a claim element in order to teach or disclose that claim element. Identity of terminology is not required for a claim element to be anticipated

by the prior art without resort to obviousness. *See In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Even in a nonobviousness setting, it is proper to take into account not only the literal and specific teachings of the reference, but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). For anticipation, the dispositive question is whether one skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly and Co. v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017).

A patent claim is unpatentable under 35 U.S.C. § 103(a) 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) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. Summary of Lewis

Lewis, titled “Method and System for Automatically Establishing a Return Label Switched Path,” discloses a method and apparatus for unilaterally forming a bi-directional label switched path between first and second routing devices in a network. Ex. 1004, codes (54), (57). The method comprises the steps of: sending a first LSP path message comprising

a first bi-directional indicator from a first routing device to a second routing device; and automatically sending a second LSP path message from the second routing device to the first routing device in response to the first bi-directional indicator. *Id.* at code (57).

Lewis discloses that, as background knowledge (“Background”), an LSP is a “uni-directional ‘tunnel’ originating at one label edge router (LER), passing through zero or more transit label switch routers (LSRs), and terminating at an egress LER.” *Id.* ¶ 3. According to Lewis, LSP tunnels are “more useful if made to appear to be bi-directional such that traffic can flow in both directions between the endpoints,” wherein the second leg of the bi-directional LSP originates at the egress LER of the first LSP and terminates at the ingress LER of the first LSP. *Id.* ¶ 5. Thus, according to Lewis, what is needed is “a procedure to automatically establish a return that traverses the same path between two endpoints as a forward LSP.” *Id.* ¶ 6.

An illustration of Lewis’s method of establishing a bi-directional LSP between two edge routings is depicted in Figure 3, reproduced below.

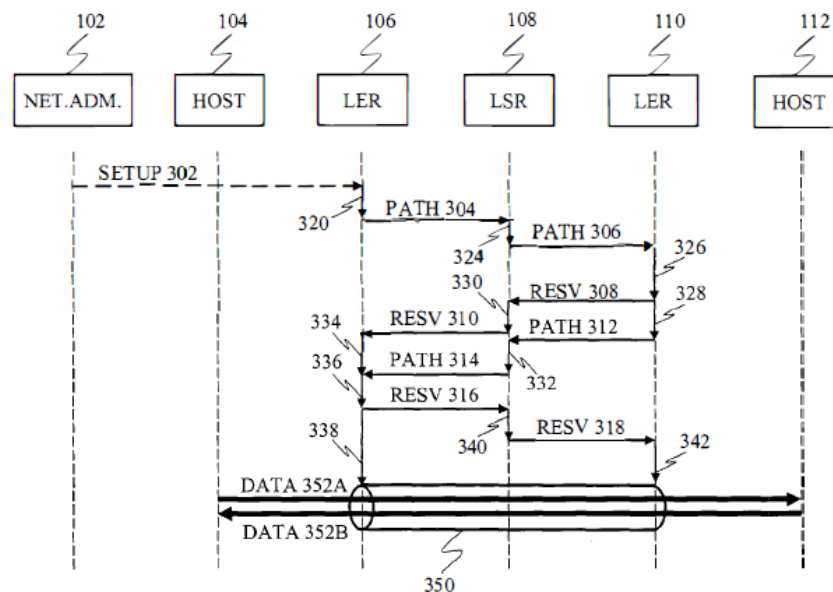


FIG. 3

Figure 3 shows a flow diagram of a method of establishing a bi-directional resource reservation protocol session between two edge routers, LER 106 and LER 110. *Id.* ¶ 15. As shown in Figure 3, network 100 is comprised of a plurality of routing devices and hosts operatively coupled. *Id.* ¶ 19.

At the periphery of network 100 is first host 104 connected to network 100 by means of first edge router 106 operated by a network administrator. *Id.* Network 100 further includes second host 112 connected to second edge router 110 maintained by another network administrator. *Id.* First edge router 106 is operably coupled to second edge router 110 either directly or indirectly by means of one or more transit routers, such as router 108. *Id.* In the embodiment shown in Figure 3, an edge router includes a “label edge router (LER)” while a transit router includes a “label switched router (LSR).” *Id.* ¶ 20.

In the embodiment shown in Figure 3, SETUP signal 302 is used at LER 106 to generate LSP path message, PATH 304, to establish a path state in the routers between the tunnel endpoints. *Id.* ¶ 27. For purposes of creating a bi-directional LSP, PATH 304 includes a bi-directional indicator, such as a “REQUEST [OBJECT]” generated by LER 106 and forwarded to LER 110, that causes the system to initiate a return LSP in addition to the forward LSP. *Id.* ¶ 29.

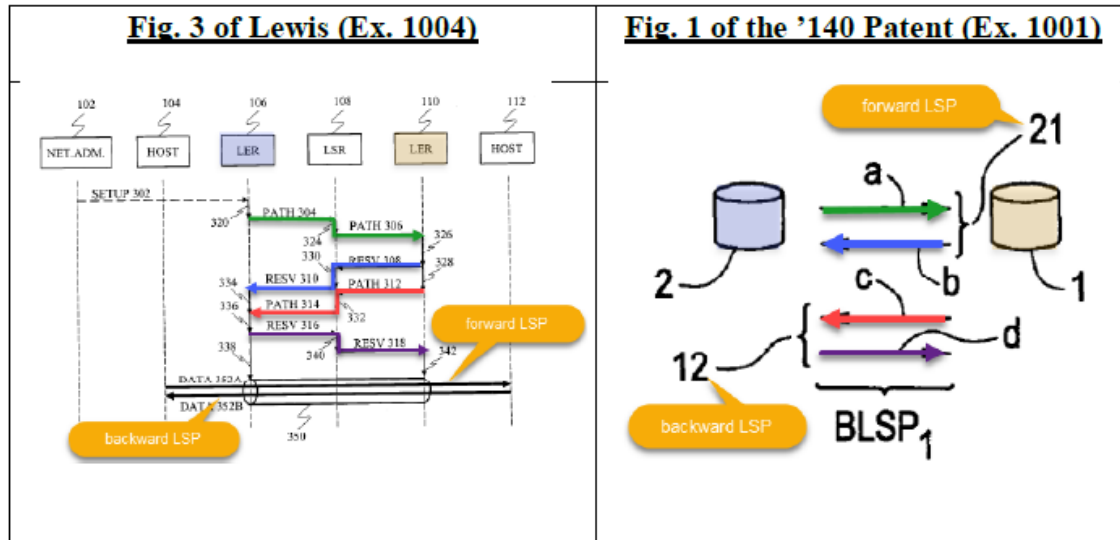
PATH 304 including REQUEST OBJECT is forwarded to LER 110 by way of network 100, which includes any number of transit routers, e.g., LSR 108. *Id.* ¶ 42. Before LSR 108 forwards PATH 304, it may record its IP address in a record route object, if present. *Id.* If the resources necessary to support a forward LSP are not available, PATH 304 is terminated, and an error message is returned to LER 106. *Id.*

In response to receipt of the first LSP setup request message, LER 110 generates LSP reservation message, RESV 308, which generally includes the same traffic flow information as the path message. *Id.* ¶ 43. REQUEST OBJECT may be included in RESV 308 in order to facilitate the association of the forward and return LSPs in the transit routers. *Id.*

In addition to RESV 308, LER 110 automatically responds to REQUEST OBJECT embedded in LSP path message, PATH 306, with its own LSP path message, PATH 312, to establish a second LSP for data flow in the direction of LER 106. *Id.* ¶ 46. PATH 312 includes a bi-directional indicator, such as a “CONFIRMATION” opaque object that causes the system to complete the construction of the return LSP. *Id.* ¶ 48. PATH 312 generated by LER 110 with CONFIRMATION object then includes all the information necessary to construct the return LSP in the opposite direction of the forward LSP. *Id.* ¶ 59. PATH 312 is then forwarded to LSR 108 for transmission to LER 106, wherein, “[a]s before,” LSR 108 makes a record of return LSP identifying information including LER 106 Endpoint IP address, the tunnel ID, and the extended tunnel. *Id.* ¶ 60.

3. Analysis

Petitioner contends that the challenged claims are anticipated or at least obvious in view of Lewis. Pet. 27 (citing Ex. 1003 ¶¶ 64–122); *see also* Pet. Reply 2. According to Petitioner, Lewis discloses an embodiment in which, like the ’140 patent, “the bi-directional LSP consists of a forward and backward LSP that has been bundled together.” Pet. 23 (citing Ex. 1004 ¶ 61, Fig. 3). Petitioner provides, for comparison, annotated Figure 3 of Lewis side-by-side with annotated Figure 1 of the ’140 patent, both shown below, to illustrate its contentions.



Id. at 23. Annotated Figure 3 of Lewis and annotated Figure 1 of the '140 patent each individually illustrates a flow diagram of the method of establishing a forward LSP and a backward LSP. *Id.* at 23–24.

Petitioner contends that in Lewis, to establish the forward LSP, as shown in annotated Figure 3, “ingress LER 106 generates and sends a forward path request message (PATH message 304/306 shown in green) that is transmitted to egress LER 110,” and “[e]gress LER 110 then generates a forward reservation message (RESV 308/310 shown in blue) that is transmitted back to ingress LER 106, which creates the first LSP in the forward direction.” Pet. 23–24 (citing Ex. 1004 ¶¶ 42–43, Figs. 3–4). Further, Petitioner contends that, similarly, annotated Figure 1 of the '140 patent shows “sending a forward path request message (in green) from the ingress LER (device 2) to the egress LER (device 1) and then receiving a reservation message (in blue) in response to establish the forward LSP.” *Id.* at 24 (citing Ex. 1001, 2:36–44, Fig. 1).

According to Petitioner, “Lewis and the '140 patent also establish the backward LSP and its association to the forward LSP in the same way.”

Pet. 24. In particular, according to Petitioner, “Lewis teaches that to establish the backward LSP egress LER 110 generates the backward path request message (PATH 312/314 shown in red) that is transmitted to ingress LER 106,” wherein “[u]pon receipt of the backward path request message, ingress LER 106 sends to egress LER 110 a backward path reservation message (RESV 316/318 shown in purple) that activates the second LSP, in the backward path direction, . . . and the forward and backward LSPs are then associated to form a bi-directional LSP.” *Id.* (citing Ex. 1004 ¶¶ 9, 46, 59–62, Figs. 3–4). Petitioner contends that “[t]his mirrors the disclosure in the ’140 patent,” which “teaches that egress LER (device 1) sends a backward path request message (message c in red) to ingress LER (device 2) and ingress LER then returns a backward path reservation message (message d in purple).” *Id.* at 24–25 (citing Ex. 1001, 2:45–60).

- i. *“A network device operable to . . . by itself generate and send in a transmission section a backward path request message to a source of a separately generated, initial forward path request message associated with a forward Label Switched Path (LSP) between the device and the source” (claim 1)*

Petitioner contends that, “[t]o the extent the preamble is limiting, Lewis discloses a network device, egress LER 110, operable to perform the steps of claim 1.” Pet. 27 (citing 1003 ¶ 64). Further, according to Petitioner, “Lewis discloses or at least renders obvious” that the network device “is operable to ‘by itself generate and send in a transmission section a backward path request message to a source of a separately generated, initial forward path request message associated with a forward Label Switched Path (LSP) between the device and the source.’” *Id.* at 28–29 (citing

Ex. 1003 ¶ 67). Petitioner provides annotated Figure 3 of Lewis, shown below, to illustrate its contentions.

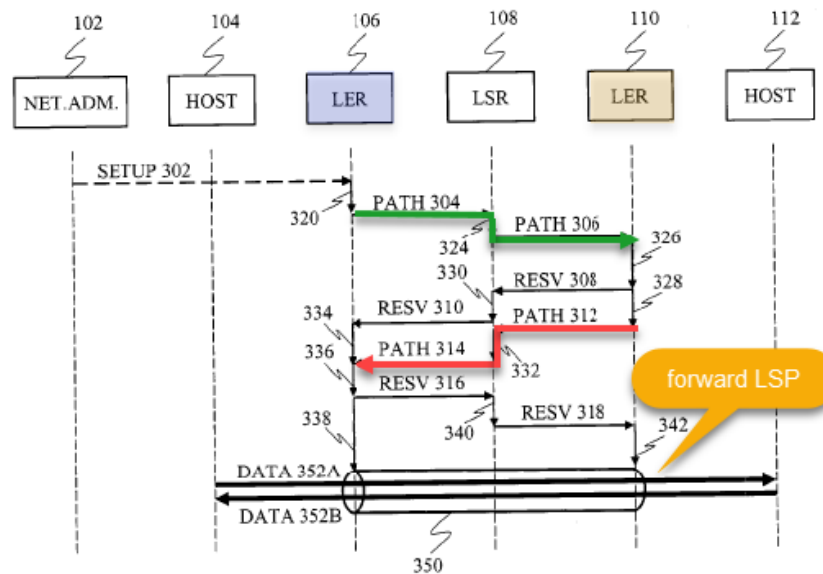


FIG. 3

Id. at 29 (citing Ex. 1003 ¶ 68; Ex. 1004, Fig. 3). The above-annotated Figure 3 of Lewis shows data transmission between “‘network device’ (LER 110) and ‘source’ (LER 106).” *Id.* According to Petitioner, the above-annotated Figure 3 of Lewis shows “‘separately generated, initial forward path request message’ (PATH 304/306 in green) associated with a forward LSP between the device and the source (orange callout),” and “the backward path request message the network device by itself generates and sends in a transmission section to the source (PATH 312/314 in red).” *Id.*

In particular, Petitioner contends that Lewis’s “PATH 304” is a “‘separately generated, initial forward path request message” associated with a forward LSP between network device LER 110 and source LER 106. Pet. 30 (citing Ex. 1003 ¶ 69). According to Petitioner, “Lewis teaches that to establish the first LSP in the forward direction, LER 106 ‘generate[s] a first LSP path message,’ such as ‘PATH message 304,’” and then “PATH

message 304 is ‘forwarded to the second LER 110 by way of network 100, which may include any number of transit routers, *e.g.*, LSR 108,’” wherein, “[a]fter receiving the forward PATH message, LER 110 generates a reservation message, RESV message 308, that it sends back to LER 106 to active the associated forward LSP between the device and the source.” *Id.* at 30–32 (first alteration in original) (citing Ex. 1004 ¶¶ 7, 24, 27, 42, 44, Figs. 3–4).

Petitioner then contends that “to establish a ‘return LSP’ in the ‘opposite direction of the forward LSP’ (*i.e.*, the backward direction), LER 110 ‘generate[s]’ a PATH message 312,” and PATH message 312 is then “sent to LER 106, which . . . is the source of the separately generated initial forward path request message (PATH message 304),” wherein “LER 110 by itself generates and sends PATH message 312 [*i.e.*, the backward path request message].” Pet. 31–32 (alterations in original) (citing Ex. 1004 ¶¶ 9, 46, 59–60, Figs. 3–4). According to Petitioner, “Lewis, like the ’140 patent, teaches that the forward path request message includes a ‘bi-directional indicator that causes the system of the present invention to initiate the return LSP’ automatically.” *Id.* at 32 (*comparing* Ex. 1004 ¶¶ 12, 29, 39–41, *with* Ex. 1001, 2:61–3:4). Further, according to Petitioner, “Lewis also explains that its system improves on the prior art by allowing LER 110 to generate the backward path request message by itself, without involvement by a network administrator.” *Id.* (citing Ex. 1004 ¶¶ 6–7).

Patent Owner replies that the Petition fails because “Lewis does not disclose or render obvious ‘send in a transmission section a backward path request message to a source of a separately generated, initial forward path request message,’ as claimed.” PO Resp. 5 (emphasis in original). In particular, according to Patent Owner, “Lewis does not disclose LER 110

sending PATH message 312 to LER 106,” but instead, “Lewis discloses LER 110 sending PATH message 312 to device LSR (label switch router) 108.” *Id.* at 6. Pointing to Petitioner’s annotated Figure 3 of Lewis in the Petition, Patent Owner contends that “LER 110 sends PATH message 312 to LSR 108, and not LER 106,” wherein “PATH message **312** never makes it to LER 106, instead, LSR 108 sends a separate PATH message **314** to LER 106.” *Id.* at 7; *see also* PO Sur-Reply 3. That is, according to Patent Owner, “LER 110 does not send PATH message 312 to LER 106, as alleged by the Petition.” PO Resp. 8; *see also* PO Sur-Reply. 9.

According to Patent Owner, the finding in the Decision Granting *Inter Partes* Review (Paper 9) “ignores the express language of the claim limitation, which requires that the claimed network device ‘by itself **generate and send** in a transmission section a **backward path request message to a source** of a separately generated, initial forward path request message associated with a forward Label Switched Path (LSP) between the device and the source.” PO Resp. 9–10 (emphasis in original); *See also* PO Sur-Reply 5–6. Patent Owner contends that, “under the plain language of the claim, the backward path request message that is generated by the claimed network device itself must be sent to the ‘source’ device,” and that “[i]t is insufficient if the message generated by the claimed network device merely reaches an intermediate device.” PO Resp. 10. In its Sur-Reply, Patent Owner emphasizes that “Lewis’ LER 106 does not receive the PATH message that was sent by LER 110 (PATH message 312),” and instead, “it receives PATH message **314**, **not 312 as required, which was generated and sent by LER 108, not LER 106 as required.**” PO Sur-Reply 7.

Patent Owner also contends that “a POSITA would not have looked to modify the disclosure of Lewis to somehow remove LSR 108 and keep

the system of Lewis functional” because “LSR 108 is fundamental to the system of Lewis.” PO Resp. 8.

In its Reply, Petitioner argues that Patent Owner’s contention that Lewis cannot disclose the contested limitation because it sends the backward path request message to **intermediate** device LSR 108 “is directly contradicted by the ’140 patent itself.” Pet. Reply 3 (citing PO Resp. 5–6). In particular, Petitioner contends that “the ’140 patent itself [] explicitly notes that the network device may send the backward path request message to the source device via one or more ‘intermediate devices.’” *Id.* According to Petitioner, Patent Owner’s apparent attempt to interpret the claims “to require **direct** transmission of the backward message from the network device to the source device would exclude the embodiments of the patent.” *Id.* at 6–7 (emphasis added). In particular, according to Petitioner, Patent Owner is “basically . . . urging the Board to add this additional limitation [of direct transmission] into claim 1” (Tr. 7), wherein this interpretation “would exclude the ‘embodiment’ of Figure 1B of the ’140 patent.” Pet. Reply 7–8 (citing Ex. 1001 at 1:65–67). Petitioner points out that “[t]he ’140 patent expressly states that one or more intermediate devices may exist between network device [1] and source device [2] in the embodiment of Figure 1B.” *Id.* at 8. Specifically, according to Petitioner, the ’140 patent states that “MPLS network 100 typically comprises a number of intermediate devices (not shown) between devices 1 and 2 and between devices 1 and 3, respectively,” wherein, because their presence is not necessary for an understanding of the present invention, “the intermediate devices have been omitted from FIGS. 1A–1C.” *Id.* (citing Ex. 1001 at 2:7–21) (emphasis omitted).

Petitioner also contends that, nevertheless, “Lewis discloses that LER 110 and LER 106 can be in direct communication with one another (without a transit router in between them).” Pet. Reply 11. In particular, Petitioner contends that, although Figure 3 of Lewis illustrates LSR 108 sitting between LERs 110 and 106, in its “Background” section, “Lewis states that messages may ‘originate[] at one label edge router (LER), pass[] through zero or more transit label switch routers (LSRs), and terminat[e] at an egress LER.’” *Id.* (citing Ex. 1004 ¶ 3 (emphasis in original)).

In its Sur-Reply, Patent Owner contends that “the Reply glosses over the express disclosure of Lewis by combining messages 312 and 314 into ‘PATH 312/314,’” but “Petitioner provides no support for that modification to Lewis.” PO Sur-Reply 7 (citing Reply 2). According to Patent Owner, Lewis discloses that “PATH message 312 does not ever leave LER 108 (the intermediate device),” but instead, “LER 108 generates its own message, 314, which is what is received by the source device.” *Id.* at 9 (citing Ex. 1004 ¶ 61 (“[t]he first LER 106 receives . . . the PATH message 314”). During oral hearing, Petitioner stressed that “[t]he main issue is as the claim language requires [] the same message,” that is, when “LER 310 generates a backward message and sends the message 312, it only sends the message which is 312 only to [LSR] 308.” Tr. 16. In particular, Patent Owner contends that Petitioner “cobble[d] together path[s] 312 and 314 into one kind of amalgum of message,” whereas “they’re separately labeled 312 and 314,” which “presumptively indicates that they are different.” *Id.*

Patent Owner also contends that the Reply’s reliance on paragraph 3 of Lewis fails because “all paragraph 3 of Lewis describes is that there existed ‘An MPLS Label Switched Path (LSP) is a unidirectional “tunnel” originating at one label edge router (LER), passing through Zero or more

transit label Switch routers (LSRS), and terminating at an egress LER,” but in “there is no discussion of the elements of this claim limitation, and as already described above, Lewis purported to improve upon the prior art expressly through its use of LSR 108.” PO Sur-Reply 11.

Referring to Petitioner’s contention that such “direct” transmission claim interpretation is inconsistent with Figure 1B of the ’140 patent, Patent Owner contends that the fact “[t]hat there may be intermediate devices in between is not inconsistent with the plain words of the claim language that requires the same message that was generated and sent be the message that is ultimately received.” PO Sur-Reply 9. As such, according to Patent Owner, “Petitioner is wrong” that “the plain words of the claim language would ‘exclude preferred embodiments.’” *Id.* at 8.

Furthermore, Patent Owner contends that, in Lewis, there is processing that occurs in LSR 108 and therefore PATH 312 is a different message when it leaves LSR 108. PO Sur-Reply 9–10 (citing Ex. 1004 ¶ 60); Tr. 18, 26. Specifically, according to Patent Owner, paragraph 60 of Lewis describes that, if properly tracked by LSR108, “the two unidirectional LSPs may be associated at [LSR] 108, after which [LSR] 108 may deconstruct, reconstruct, or re-route the two LSPS together instead of treating each independently,” and as such, “Lewis confirms again that PATH message 312 is **not** sent to LER 106.” PO Sur-Reply 10 (citing Ex. 1004 ¶ 60, Fig. 4 (emphasis in original)).

Based on the complete record presented, we find Patent Owner’s arguments unavailing. In particular, although Patent Owner contends that Lewis’ PATH 312 “does not ever leave [LSR]108 (the intermediate device)” (PO Sur-Reply 9), in Lewis, PATH 312 is “forwarded to [LSR] 108 *for transmission to the first LER 106.*” Ex. 1004 ¶ 60 (emphasis added). That

is, although we agree with Patent Owner that “Lewis discloses LER 110 sending PATH message 312 to device LSR (label switch router) 108” (PO Resp. 6), we note that Lewis discloses PATH 312 is forwarded to LSR 108 so that LSR 108 can transmit the path message to first LER 106. *See* Ex. 1004 ¶ 60. In other words, in Lewis, path messages are forwarded from *one edge router to another* (i.e., from first LER 106 to second LER 110, or vice versa) “by way of network 100, which may include any number of transit routers, e.g., LSR 108” (*see id.* ¶ 42), including zero routers (*see id.* ¶¶ 3 (an LSP “originat[es] at one . . . LER[], pass[es] through zero . . . LSRs . . . terminating at an egress LER”), 19 (“first edge router 106 is operably coupled to the second edge router 110 . . . directly”)). That is, LSR 108 is neither the source nor destination device, but rather, the possible transit point (for greater than zero applications) between the source and destination device. *See id.* ¶ 42.

Accordingly, we also find unavailing Patent Owner’s contention that Lewis’ PATH 312 “never makes it to LER 106, instead, LSR 108 sends a separate PATH message 314 to LER 106.” PO Resp. 7; PO Sur-Reply 3. In particular, we find unavailing Patent Owner’s contention that PATH 312 and PATH 314 are “separately labeled 312 and 314,” which “presumptively indicates that they are different.” Tr. 16. Contrary to Patent Owner’s contention, in Lewis, LSR 108 is the transit point, wherein PATH 312 is to be received by LER 106 from LER 110 via LSR 108. Ex. 1004 ¶ 60. We find persuasive Petitioner’s contention that providing separate “PATH 312” and “PATH 314” labels in Figure 4 does not mean they are not the same path message, wherein such labeling is used to clarify as to the path of the path message being discussed. Tr. 30. Here, Petitioner contends, as supported by Dr. Weissman’s testimony, and as highlighted in its annotated

Figure 3 of Lewis reproduced above, that LER 110 generates and sends backward path request message (collectively “PATH 312/314” in red) to LER 106 that is the source of separately generated, initial forward path request message (collectively “PATH 304/306” in green) associated with an LSP between LER 106 and LER 110. Pet. 29; Ex. 1004 ¶¶ 46, 59–60; Ex. 1003 ¶ 59. We are persuaded by Petitioner’s contention that “PATH 312” is used to refer to the path message as it is forwarded from LER 110 to LSR 108, while “PATH 314” is used to refer to the path message as it is transmitted from LSR 108 to LER 106. *Id.*

We also find unavailing Patent Owner’s contention that Lewis’ paragraph 60 discloses that processing takes place to the path message, PATH 312, before being transmitted to LER 106. PO Sur-Reply 10; Tr. 16. In particular, although paragraph 60 of Lewis discloses that LSR 108 “may deconstruct, reconstruct, or re-route the two LSP[s]” under certain conditions, this paragraph does not discuss any processing to PATH 312 before transmission to LER 106. See Ex. 1004 ¶ 60. Instead, paragraph 60 makes clear that “[a]s before, the transit router 108 preferably makes a record of return LSP identifying information including the first LER 106 Endpoint IP address, the tunnel ID, and the extended tunnel ID” when PATH 312 is forwarded to transit router/LSR 108 “*for transmission* to the first LER 106.” *Id.* (emphasis added). That is, as paragraph 60 of Lewis indicates, LSR 108 records information about the LSP before forwarding PATH 312 to first LER 106 (*see id.*), similar to paragraph 42 (i.e. “[a]s before”), where LSR 108 makes a record of the LSP before forwarding PATH 304 to LER 110, wherein LSR 108 merely forwards the path message without processing or modifying the path message. See *id.* ¶ 42.

Furthermore, we find unavailing Patent Owner's contention that Lewis' path message is sent to "an intermediate device." PO Resp. 10. As Petitioner points out, the '140 patent itself "expressly states that one or more intermediate devices may exist between network device [1] and source device [2] in the embodiment of Figure 1B." Pet. Reply 8. Specifically, the '140 patent states that "MPLS network 100 typically comprises a number of intermediate devices (not shown) between devices 1 and 2 and between devices 1 and 3, respectively," wherein, because their presence is not necessary for an understanding of the present invention, "the intermediate devices have been omitted from FIGS. 1A–1C." See Ex. 1001, 2:11–19.

Nevertheless, we are persuaded by Petitioner's contention that, although Figure 3 of Lewis illustrates LSR 108 provided between LER 110 and LER 106, Lewis also discloses that "LER 110 and LER 106 can be in direct communication with one another (without a transit router in between them)." Pet. Reply 11. In particular, in its "Background" section, Lewis states an LSP is a "uni-directional 'tunnel' originating at one label edge router (LER), passing through zero or more transit label switch routers (LSRs), and terminating at an egress LER." Ex. 1004 ¶ 3. That is, Lewis discloses that an LSP originates at one LER and terminates at an egress LER, wherein it is possible to have no ("zero") transit LSR provided therebetween. *Id.* In fact, in its "Detailed Description" section, Lewis also states that "[t]he first edge router 106 is operably coupled to the second edge router 110, either *directly or* indirectly by means of one or more transit routers, such as router 108." *Id.* ¶ 19 (emphasis added). That is, LSR 108 is a transit point between LER 110 and 106 that can be omitted (i.e, when LERs 106 and 110 are connected "directly" or when there is "zero" application). See *id.* ¶¶ 3, 19.

We further find unavailing Patent Owner's contention that Petitioner's reliance upon the "Background" section of Lewis fails because it does not contain "discussion of the elements of this claim limitation," and that "Lewis purported to improve upon the prior art expressly through its use of LSR 108." PO Sur-Reply 11. While Lewis discloses that an LSP has "zero or more" LSRs between LERs in its "Background" section (Ex. 1004 ¶ 3), in its "Detailed Description" section, Lewis also discloses that LER 110 and LER 106 may be directly coupled. See Ex. 1004 ¶ 19. Furthermore, Lewis' "Background" section expressly states LSP tunnels are "more useful if made to appear to be bi-directional such that traffic can flow in both directions between the endpoints," wherein the second leg of the bi-directional LSP originates at the egress LER of the first LSP and terminates at the ingress LER of the first LSP. *Id.* ¶ 5. That is, Lewis expressly states that, to improve upon the prior art, bi-directional LSPs are provided such that traffic can flow in both directions between the end points, whereas nothing in this "Background" section of Lewis purported to improve upon the prior art "expressly" through an LSR, let alone "its use of LSR 108," as Patent Owner contends. *Id.* ¶¶ 3–6; see PO Sur-Reply 11.

Based on the complete record presented, Petitioner has demonstrated persuasively that Lewis teaches a "network device" (i.e., LER 110) operable to, "by itself *generate* and send in a transmission section a backward path request message" (i.e., "PATH 312/314") to a "source" (i.e., LER 106) of "a separately generated, initial forward path request message" (i.e., "PATH 304/306") "associated with a forward Label Switched Path (LSP) between the device and the source," as recited in claim 1, regardless of whether or not the preamble is limiting.

- ii. *receive in a receiving section a backward path reservation message from the source in order to establish a backward LSP between the device and the source, wherein the separately established forward and backward LSPs form a bi-directional LSP between the device and the source (claim 1)*

Petitioner contends that Lewis discloses receiving “a backward path reservation message from the source in order to establish a backward LSP between the device and the source,” wherein the forward and backward LSPs “form a bi-directional LSP between the device and the source,” as recited in claim 1. Pet. 36 (citing Ex. 1003 ¶ 76). Petitioner provides annotated Figure 3 of Lewis, shown below, to illustrate its contentions.

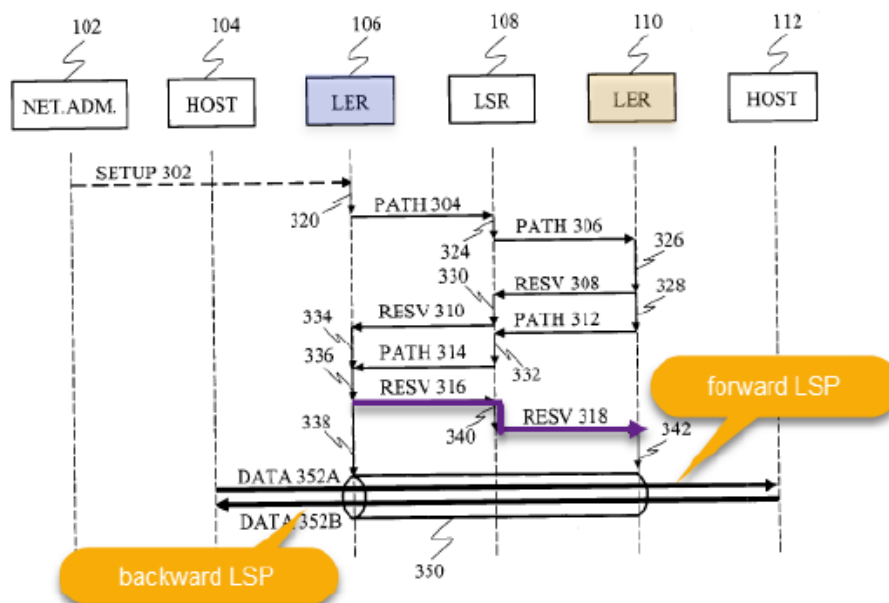


FIG. 3

Id. at 36 (citing Ex. 1003 ¶ 77; Ex. 1004, Fig. 3). The above-annotated Figure 3 of Lewis in the Petition shows data transmission between “network (LER 110) and source devices (LER 106).” *Id.*

According to Petitioner, the above-annotated Figure 3 of Lewis in the Petition shows “the network device receives in a receiving section a

backward path reservation message from the source (RESV 316/318 in purple) in order to establish a backward LSP between the device and the source (orange callout labeled ‘backward LSP’).” *Id.* at 36–37 (citing Ex. 1003 ¶ 77; Ex. 1004, Fig. 3). In particular, Petitioner contends that “[i]n response to receiving the backward PATH request message, LER 106 ‘generates’ a ‘second LSP reservation message,’ which is shown as RESV message 316 in Figure 3, that ‘is returned to the second LER 110 by intermediate LSR 108,’” and “[u]pon receipt of the RESV message 318, the second LER 110 activates the second unidirectional LSP’ to tunnel data from ‘the second LER 110 to the first LER 106.’” *Id.* at 37 (citing Ex. 1003 ¶ 78; Ex. 1004 ¶ 61). Thus, according to Petitioner, “[a] POSITA would understand that the second LSP reservation message is a backward path reservation message because its receipt establishes a backward LSP between LER 110 and LER 106.” *Id.* at 37–38 (citing Ex. 1003 ¶ 78).

Further, Petitioner contends that “Lewis also discloses that the separately established forward and backward LSPs form a bi-directional LSP between the device and the source.” Pet. 38 (citing Ex. 1004, Abstract, ¶ 62). Patent Owner does not address separately Petitioner’s explanations and supporting evidence regarding these claim limitations of claim 1. *See generally* PO Resp.; PO Sur-Reply.

Based on the complete record presented, Petitioner has demonstrated persuasively that Lewis teaches a “network device” (i.e., LER 110) operable to “receive in a receiving section a backward path reservation message from the source” (i.e., LER 106) in order to “establish a backward LSP between the device and the source,” wherein “the separately established forward and backward LSPs form a bi-directional LSP between the device and the source,” as recited in claim 1.

iii. *Conclusion (claim 1)*

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that claim 1 is anticipated by or obvious over Lewis.

iv. *Independent claims 16, 21, and 34; and dependent claims 2–7, 13, 15, 17–19, 22–25, 31, 33, and 35–38*

Petitioner provides detailed explanations as to how Lewis teaches the claim limitations as recited in independent claims 16, 21, and 34, and dependent claims 2–7, 13, 15, 17–19, 22–25, 31, 33, and 35–38, citing Dr. Weissman’s testimony for support. Pet. 39–58 (citing Ex. 1004, code (57), ¶¶ 6–7, 9–10, 20, 24, 26–29, 39–42, 44, 46, 59–62, 66, Figs. 3–4; Ex. 1003 ¶¶ 80–81, 83–85, 87–88, 90–91, 94, 97–105, 108).

As for independent claims 16, 21, and 34, Patent Owner merely contends that “the Petition fails for the same reasons as discussed . . . above,” with respect to claim 1. PO Resp. 11. Further, Patent Owner does not address separately Petitioner’s explanations and supporting evidence regarding the dependent claims. *See generally* PO Resp.

As discussed above in Sections II(C)(3)(i)–(iii), we find unavailing Patent Owner’s contention that Lewis is deficient with respect to claim 1. Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that independent claims 16, 21, and 34, and the dependent claims respectively depending from claims 1, 16, 21, and 34, are anticipated by or would have been obvious over Lewis.

D. Claims 3, 4, 6, 23, and 24

Petitioner contends that claims 3, 4, 23, and 24 of the '140 patent would have been obvious over Lewis and Shankur. Pet. 58–63. Petitioner cites Shankur as disclosing to a person of ordinary skill “that an edge node, such as LER 110 in Lewis, may establish bi-directional LSPs between itself and a source device.” *Id.* at 59–60. Citing Dr. Weissman’s testimony for support, Petitioner provides detailed explanations as to how Lewis and Shankur teach the limitations claims 3, 4, 23, and 24, and why a person of ordinary skill would have had reason to combine the teachings of Lewis and Shankur. Pet. 58–63 (citing Ex. 1004 ¶¶ 6, 10, 23, 41, Fig. 3; Ex. 1005 ¶¶ 23, 28, 35, Fig. 1A–1C; Ex. 1003 ¶¶ 124–130).

Patent Owner does not address separately Petitioner’s explanations and supporting evidence regarding claims 3, 4, 6, 23, and 24. *See generally* PO Resp.; PO Sur-Reply.

As discussed above in Section II(C)(3)(i)–(iii), we find unavailing Patent Owner’s contention that Lewis is deficient with respect to independent claims 1 and 22. Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that the limitations of claims 3, 4, 6, 23, and 24, depending respectively from claims 1 and 22, would have been obvious over the combination of Lewis and Shankur.

III. CONCLUSION

For the foregoing reasons, we are persuaded on the record at hand that Petitioner has demonstrated by a preponderance of the evidence that the

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challenged claims 1–7, 13, 15–19, 21–25, 31, and 33–38 of the '140 patent are unpatentable.

IV. ORDER³

For the reasons given, it is

ORDERED that, based on the preponderance of the evidence, claims 1–7, 15–19, 21–25, 31, and 33–38 of U.S. Patent No. 7,596,140 have been shown to be unpatentable; 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.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–7, 13, 15–19, 21–25, 31, 33– 38	102	Lewis	1–7, 13, 15– 19, 21–25, 31, 33–38	
1–7, 13,	103	Lewis	1–7, 13, 15–	

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

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15–19, 21–25, 31, 33– 38			19, 21–25, 31, 33–38	
3, 4, 6, 23, 24	103	Lewis, Shankar	3, 4, 6, 23, 24	
Overall Outcome			1–7, 13, 15– 19, 21–25, 31, 33–38	

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