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Paper 7
Entered: April 25, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

SMART PATH CONNETIONS, LLC,
Patent Owner.

IPR2021-01551
Patent 7,551,599 B2

Before DAVID C. MCKONE, NATHAN A. ENGELS,
and STEVEN M. AMUNDSON, *Administrative Patent Judges.*

MCKONE, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Unified Patents, LLC ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 32, 34, 40, 41, 47, 49, 53, and 54 of U.S. Patent No. 7,551,599 B2 (Ex. 1001, "the '599 patent"). Pet. 1. Smart Path Connections, LLC ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2020). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." For the reasons explained below, we decline to institute an *inter partes* review of the '599 patent.

B. Related Matters

Petitioner advises us that the '599 patent has been asserted in *Smart Path Connections, LLC v. Adtran, Inc.*, Case No. 6:21-cv-00326-ADA (W.D. Tex.), and *Smart Path Connections, LLC v. Juniper Networks, Inc.*, Case No. 6:21-cv-00328-ADA (W.D. Tex.), both of which have been terminated. Pet. 1. Patent Owner states that *Juniper Networks, Inc. v. Smart Path Connections, LLC*, IPR2021-01170 (PTAB), and *Juniper Networks, Inc. v. Smart Path Connections, LLC*, IPR2021-01356 (PTAB), may affect or be affected by a decision in this proceeding. Paper 4, 1.

C. The ’599 Patent

The ’599 patent relates to communication of data between elements on a layer-2 network and elements on a layer-3 network. Ex. 1001, 4:16–27. According to the Specification,

> Data networks, including LANs, are commonly conceptualized as a hierarchy of layers according to the Open System Interconnection Model (OSI). OSI defines a networking framework for implementing protocols in seven layers, of which layer-3 (network layer), and layer-2 (data link layer) are relevant to the instant invention.
>
> [Layer-3] provides high level switching and routing technologies, and creates logical paths, known as virtual circuits, for transmitting data from node to node. In layer-3, data is transmitted by creating a frame that usually contains source and destination network addresses.
>
> Layer-2 encapsulates the layer-3 frame, adding more detailed data link control information to form a new, larger frame. Layer-2 implements a transmission protocol and handles flow control, frame synchronization, and handles errors arising in the physical layer (layer-1).

Id. at 1:54–2:5. The Specification also identifies a limitation of protocols that route data on through these networks:

> Currently, layer-3 routing protocols, such as RIP[[1]] and OSPF[[2]], are unaware of the topology of layer-2 RPR[[3]]

[1] “Routing information protocol.” *Id.* at 1:36.

[2] “The Open Shortest Path First (OSPF) protocol is a link-state layer-3 routing protocol used for Internet routing. . . . OSPF is used by a group of Internet Protocol (IP) routers in an Autonomous System (AS) to exchange information regarding the system topology. The term ‘Autonomous System’ denotes a group of routers exchanging routing information via a common routing protocol. Each OSPF router maintains an identical topology database, with exceptions as noted below. Based on this database, the routers calculate their routing tables by constructing a shortest-path tree to each of the other routers.” *Id.* at 2:18–34.

[3] “Resilient packet rings – a protocol.” *Id.* at 1:37.

> networks with which they must interact. A routing table allows the router to forward packets from source to destination via the most suitable path, i.e., lowest cost, minimum number of hops. The routing table is updated via the routing protocol, which dynamically discovers currently available paths. The routing table may also be updated via static routes, or can be built using a local interface configuration, which is updated by the network administrator. However, the RPR ingress and egress nodes chosen in the operation of automatic routing protocols do not take into account the internal links within the RPR ring, and may therefore cause load imbalances within the RPR subnet, which generally results in suboptimum performance of the larger network.

Id. at 3:65–4:12.

Figure 1, reproduced below, illustrates an embodiment of the invention:

FIG. 1

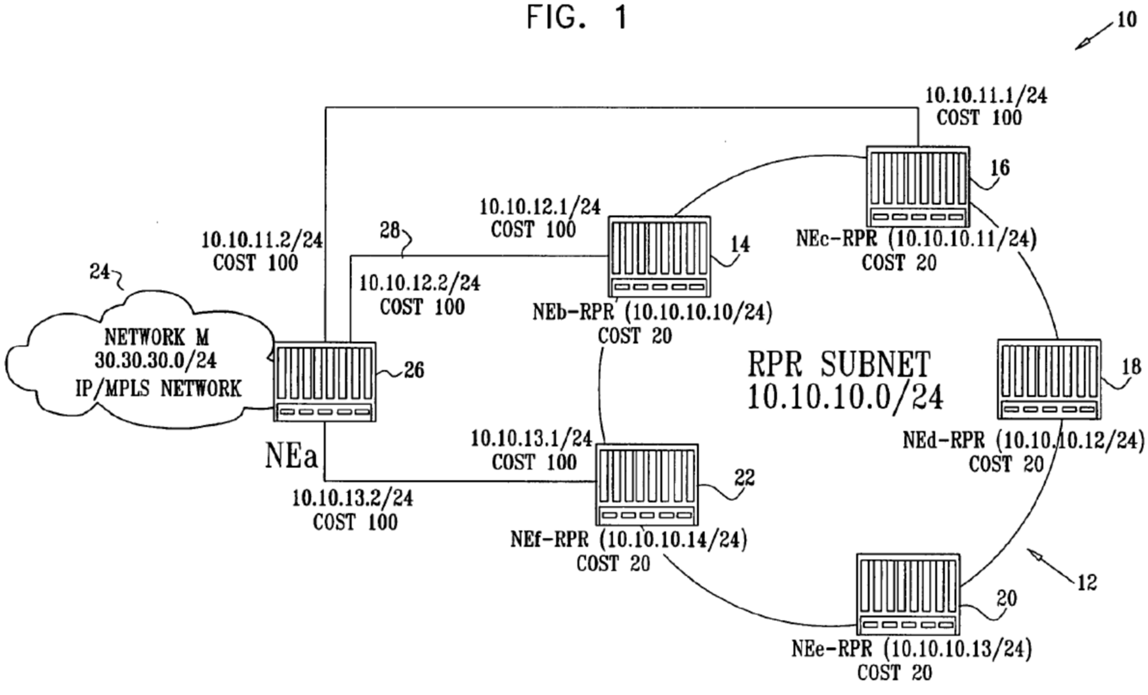

Figure 1 is a schematic diagram of a portion of a data network. *Id.* at 6:61–63, 7:33–36. In data network 10, RPR subnet 12 (a layer-2 ring network) is formed of RPR nodes 14, 16, 18, 20, 22, of which nodes 14, 16, and 22 are interface nodes interfacing with external layer-3 network 24. *Id.* at 7:36–39.

The external layer-3 network includes IP/MPLS[4] node 26. *Id.* at 7:44–45. IP/MPLS node 26 builds a routing table (also referred to as a routing database) containing routing entries for specific destination networks and, for each destination network, the specification of a hop to the next router along the path to the destination network. *Id.* at 7:49–53.

In RPR subnet 12, all nodes have the same cost (e.g., 20), therefore, IP/MPLS node 26 would configure its routing database to point to a single minimum-cost next hop and use that entry point for all signaled label-switched paths to subnet 12. *Id.* at 8:11–19. According to the Specification, in the prior art, layer-3 protocols such as OSPF are unaware of the topology of a layer-2 RPR ring such as subnet 12, and IP/MPLS node 26, using OSPF, would route packets to subnet 12 via the entry point that is the least cost from IP/MPLS node 26. *Id.* at 8:20–25. In Figure 1, each route to ingress nodes 14, 16, 22 has the same cost, 100. *Id.* at 8:25–27. Thus, any of the three could be chosen arbitrarily, and that node would be used for all communications between subnet 12 and IP/MPLS node 26. *Id.* at 8:27–28. Similarly, for communications from subnet 12 to IP/MPLS node 26 (the egress direction), the same exit point (of RPR nodes 14, 16, 22) would be used, regardless of how many spans are between the chosen egress node and the RPR node 16, 18, 20 sending the communication. *Id.* at 9:1–15.

In the ingress direction, the invention manipulates the costs associated with different RPR nodes 14, 16, 18, 20, 22 so as to cause the routing table of IP/MPLS node 26 to point to different RPR-IP host addresses in RPR subnet 12 via different ingress nodes. *Id.* at 9:27–36. "The costs are

[4] "Internet protocol," "Multi-protocol label switching." *Id.* at 1:24, 1:30.

typically manipulated using a metric that favors signaled LSP[5] tunnels and other paths that cover the minimum number of hops (or least incur minimum cost) from the entry point to the desired RPR node." *Id.* at 9:36–40. Specifically, "[t]he method relies on addition of each RPR node's RPR-IP address (or alternatively, the node's IP loopback address) to the node's OSPF host table . . . and assigning a manipulated cost that is relative to the number of layer-2 RPR spans." *Id.* at 9:63–67. According to the Specification, "each RPR node has a constructed RPR reference topology that specifies all other ring nodes, and their relative position within the RPR ring, i.e., the number of spans. The cost factor is based on the number of RPR spans between the RPR node and the entry point to the ring." *Id.* at 10:7–12. All RPR host addresses are added to the host routing table and entries are assigned a cost metric. *Id.* at 10:25–48. Then, "entries in the OSPF host table are flooded in the current OSPF area using router LSA packets. This step updates all external routers as well as all RPR nodes with the new entries." *Id.* at 11:13–17. IP/MPLS node 26 is informed by the router LSA packets that there is a new route to the advertised hosts in RPR subnet 12. *Id.* at 11:18–21. As a result, "external routers now evaluate alternate paths to the nodes of a RPR subnet, based on the OSPF database updates that they received." *Id.* at 11:31–33.

In the egress direction,

> the same cost manipulation causes the host routing tables of the RPR nodes 14, 16, 18, 20, 22 in the RPR subnet 12 to select different respective RPR ring exit nodes for outbound IP traffic intended for the same destination network. The exit point that is selected for the RPR nodes 14, 16, 18, 20, 22 is based on

[5] "Label-switched path." *Id.* at 1:28.

> minimum cost, taking into consideration the number of RPR spans required to reach the exit node.

Id. at 9:41–48.

Claims 32 and 47, reproduced below,[6] are illustrative of the claimed subject matter:

> 32. [32.pre] A network routing system for obtaining ingress from an external layer-3 network to a layer-2 ring network to reach nodes thereof, comprising:
>
> > [32.i] first routers disposed in ingress nodes of said ring network, said first routers being configured for creating entries in a host table, each of said entries comprising an address of a respective one of said nodes of said ring network and a metric;
> >
> > [32.ii] said first routers being further configured for uploading said host table to external elements of a data network that interfaces with said ring network via said ingress nodes;
> >
> > [32.iii] a second router disposed in at least one of said external elements, said second router being configured for defining paths from said external elements to designated ones of said nodes of said ring network, each of said paths leading through a selected one of said ingress nodes responsively to said metric; and
> >
> > [32.iv] transmitting data from network elements that are external to said ring network to at least one of said nodes via a selected one of said paths.
>
> 47. [47.pre] A method for obtaining egress from a layer-2 ring network to an external layer-3 network, comprising the steps of:
>
> > [47.i] in nodes of said ring network creating entries in a host table, each of said entries comprising an address of a respective one of said nodes of said

[6] We add formatting and bracketed numbering corresponding to the numbering Petitioner uses in its claim charts. *See, e.g.*, Pet. 42–55, 73–82.

ring network and a metric determined responsively to a topology of the ring network;

[47.ii] defining paths from said nodes through egress nodes of said ring network to external elements in said external layer-3 network;

[47.iii] selecting one of said paths responsively to said metric; and

[47.iv] transmitting data from at least one of said nodes via said selected one of said paths to network elements that are external to said ring network.

D. Evidence

Petitioner relies on the references listed below.

Reference		**Date**	**Exhibit No.**
Sistanizadeh	US 6,963,575 B1	Nov. 8, 2005 (filed Feb. 27, 2001)	1004
Fan	US 6,625,124 B1	Sept. 23, 2003 (filed Mar. 3, 2000)	1005
Kalmanek	US 6,711,152 B1	Mar. 23, 2004 (filed July 6, 1999)	1006

Petitioner also relies on the Declaration of Mihail L. Sichitiu, Ph.D. (Ex. 1002, "Sichitiu Decl.").

E. The Asserted Grounds

Petitioner asserts the following grounds of unpatentability (Pet. 4):

References	Basis	Claim(s) Challenged
Sistanizadeh	§ 102(a)[7]	32, 34, 40, 41
Sistanizadeh	§ 103(a)	32, 34, 40, 41
Sistanizadeh, Kalmanek	§ 103(a)	32, 34, 40, 41
Fan	§ 102(a)	47, 49, 53, 54
Fan	§ 103(a)	47, 49, 53, 54
Fan, Kalmanek	§ 103(a)	47, 49, 53, 54

II. ANALYSIS

A. Claim Construction

We construe a claim

> 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), including construing the 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) (2021); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Petitioner submits that "no explicit constructions (beyond plain and ordinary meaning under the *Phillips* standard) are required." Pet. 19. For its part, "Patent Owner requests that the Board adopt the ordinary and

[7] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '599 patent has an effective filing date before the effective date of the relevant provisions of the AIA, we cite to the pre-AIA versions of §§ 102 and 103.

customary meaning of the claim terms as understood by one of ordinary skill in the art." Prelim. Resp. 11.

Nevertheless, both parties implicitly construe claim terms in their application of the prior art to the claims. We address the terms "a metric" (claim 32) and "an external layer-3 network" (claim 47) below. Based on the record before us, we do not find it necessary to provide express claim constructions for any other terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe 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)).

1. "a metric"

Claim 32 recites "each of said entries comprising an address of a respective one of said nodes of said ring network and *a metric*," and "each of said paths leading through a selected one of said ingress nodes responsively to *said metric*."

As explained in more detail below, Petitioner contends that Sistanizadeh's "associated COST of using the next link path to each of those neighbors as the next hop" is "a metric" as recited in claim 32. Pet. 47 (citing Ex. 1004, 21:43–49); *see also id.* at 21–22 (citing Ex. 1004, 13:36–47, 21:25–59; Ex. 1002 ¶ 108). The parties appear to agree that Sistanizadeh's COST is associated with bandwidth rather than the number of spans between nodes. *Id.* at 25–26 ("a POSITA would have modified Sistanizadeh's 'COST' to reflect the number of spans between nodes, rather than having 'COST' associated with bandwidth as disclosed in the reference"); Prelim. Resp. 30 ("it[']s clear that the COST disclosed in

Sistanizadeh is directly pertinent to bandwidth, not the number of spans required to traverse the subnet").

Patent Owner argues that Sistanizadeh's COST "has nothing to do with the metric defined in the '599 Patent." Prelim. Resp. 30. Patent Owner argues that "[a]s the '599 Patent s[t]ates, the metric is determined responsively to a number of hops between the ingress nodes and the respective one of the nodes." *Id.* (citing Ex. 1001, 5:13–20, claim 41). According to Patent Owner, "[t]he 'cost factor' that defines the metric in many claims, such as Claim 41, is defined not by bandwidth, but instead by the number of spans required to traverse the subnet from the entry point to a destination node of the subnet." *Id.* (citing Ex. 1001, 4:25–27). Thus, although Patent Owner does not expressly raise a claim construction dispute, Patent Owner contends that "a metric" is defined by the '599 patent as the number of spans required to traverse a subnet from an entry point to a destination node, and excludes bandwidth.

Patent Owner's understanding of "a metric" is not supported by the '599 patent. As Patent Owner observes, claim 41, which depends from claim 32, recites "wherein said metric comprises a cost factor that is computed between one of said ingress nodes and said respective one of said nodes." This suggests that "a metric," as recited in claim 32, is broader than, and not limited to, a number of spans between two nodes. *See Phillips*, 415 F.3d at 1314–15 ("[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." (citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004)).

The Specification confirms that "a metric" is broader than Patent Owner's understanding. For example, the Specification states:

> In the detailed examples given below, the metric is defined in such a way that the route selected is the one with the lowest metric score. Alternatively, *many different metrics can be defined*. For example, the metric may be defined so that the dynamic selection of ingress and exit points could be responsive to a maximum value of the metric.

Ex. 1001, 9:49–54 (emphasis added). Thus, we conclude that "a metric" is not limited to a number of spans or hops between two nodes and can include other properties, such as bandwidth.

2. "an external layer-3 network"

Claim 47 recites "[a] method for obtaining egress from a layer-2 ring network to *an external layer-3 network*," and "defining paths from said nodes through egress nodes of said ring network to external elements *in said external layer-3 network*."

As explained in more detail below, Fan discloses a ring network interfacing with two separate internet networks via a single node for each internet. *See, e.g.,* Ex. 1005, Fig. 1 (ring network 20, internets 26, 27, interface nodes 24, 25). Petitioner contends that Fan's nodes 24 and 25 are "egress nodes of said ring network" and that each of internets 26 and 27 is "an external layer-3 network." Pet. 58–59. In its claim charts, Petitioner repeatedly refers to internets 26 and 27 as "external Layer-3 networks," purporting to invoke the claim language "external layer-3 network," but making it plural rather than the recited singular. *Id.* at 74–75, 77–78. Thus, although Petitioner does not expressly raise a claim construction dispute, Petitioner here appears to contend that "an external layer-3 network" means "one or more layer-3 networks," such that paths need only be defined through a single egress node to an external network, so long as there are more than one external networks, each of which interfaces with a single separate node, as described in Fan.

For its part, Patent Owner argues that "[u]nlike the claims of the '599 Patent, Fan's Virtual Network includes a singular connection from a Node to an open public internet." Prelim. Resp. 33 (citing Ex. 1005, 5:26–27, Fig. 1). Patent Owner contrasts Fan with the '599 patent, which "shows multiple ingress / egress routes from the layer-2 ring network to the external layer 3 network." *Id.* at 34 (citing Ex. 1001, Fig. 1). According to Patent Owner, "[t]he '599 Patent claims a ring network that has multiple nodes that can access an external layer 3 network so that a metric is used to determine the egress path." *Id.*

Petitioner's implicit construction is not supported by the record. "As a general rule, the words 'a' or 'an' in a patent claim carry the meaning of 'one or more.' That is particularly true when those words are used in combination with the open-ended antecedent 'comprising.'" *TiVo, Inc. v. EchoStar Commc'ns Corp.*, 516 F.3d 1290, 1303 (Fed. Cir. 2008) (quoting *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342–43 (Fed. Cir. 2008); citing *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997)). "However, the question whether 'a' or 'an' is treated as singular or plural depends heavily on the context of its use." *Id.* (citing *Norian Corp. v. Stryker Corp.*, 432 F.3d 1356, 1359 (Fed. Cir. 2005)). "The general rule does not apply when the context clearly evidences that the usage is limited to the singular." *Id.* (citing *Baldwin Graphic*, 512 F.3d at 1344); *accord Norian*, 432 F.3d at 1359 ("[T]hat general rule does not apply when the specification or the prosecution history shows that the term was used in its singular sense.").

Here, the claim language and the Specification evidence that "an external layer-3 network" is singular. As to the language of the claims, claim 47 expressly refers to elements in the singular or plural when the singular or plural is intended. For example, claim 47 refers to "nodes" (plural) of "a layer-2 ring network" (singular) and "said ring network" (singular). In another example, claim 47 refers to "paths" (plural) from "said nodes" (plural) through "egress nodes" (plural) of "said ring network" (singular) to "external elements" (plural) in "said external layer-3 network" (singular). Here, the plain language of claim 47 is describing a system where one layer-2 ring network has plural nodes, one external layer-3 network has plural elements, and there are plural paths, with plural egress nodes, between the single layer-2 ring network and the single external layer-3 network. The use of "comprising" in claim 47 does not counsel otherwise. Rather, claim 47 contemplates that additional steps might be performed, but the use of "comprising" does not suggest that the use of "said external layer-3 network" should be broadened to plural networks. Put differently, although a system practicing the claimed method might have additional layer-2 or layer-3 networks, the system must define paths from nodes on a single layer-2 ring network through plural egress nodes of that ring network to external elements in a single external layer-3 network.

This is consistent with how the invention is described in the Specification. Figure 1 depicts a single layer-2 ring network with multiple nodes, a single external layer-3 network with multiple nodes, and three ingress/egress points between these two networks. Ex. 1001, 7:33–48, Fig. 1. The problem described in the patent is that the layer-3 network is unaware of the topology of the layer-2 ring network and, thus, might arbitrarily choose an inefficient ingress/egress node out of multiple such nodes for communications between the two networks. *Id.* at 3:65–12, 8:11–9:15. The Specification describes techniques for providing nodes of the external layer-3 network with information to help it choose the most efficient of the plural ingress/egress points between the two networks. *Id.* at 9:27–12:46. This

> provide[s] for the manipulation of layer-3 network nodes, external routers, routing tables and elements of layer-2 ring networks, such as RPR networks, enabling the layer-3 elements to view the topology of a layer-2 ring subnet. This feature permits routers to choose optimal entry points to the layer-2 subnet for different routes that pass into or through the layer-2 subnet.

Id. at 4:16–23. There is no suggestion in the Specification that the invention contemplates defining and selecting paths and egress nodes between the layer-2 ring network and more than one external layer-3 network.

Accordingly, "an external layer-3 network," and the later reference in claim 47 to "said external layer-3 network," is a single network, not one or more networks.

B. Sistanizadeh Grounds

Petitioner contends that claims 32, 34, 40, and 41 are anticipated by Sistanizadeh, would have been obvious over Sistanizadeh, and would have been obvious over Sistanizadeh and Kalmanek. Pet. 42–58.[8]

A claim is unpatentable for anticipation under 35 U.S.C. § 102 if a single prior art reference either expressly or inherently discloses every limitation of the claim. *See Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d

[8] When quoting from the Petition throughout, we omit color emphasis added by Petitioner.

967, 975 (Fed. Cir. 2010). Moreover, "[a]nticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." *Crown Packaging Tech., Inc. v. Ball Metal Beverage Container Corp.*, 635 F.3d 1373, 1383 (Fed. Cir. 2011) (citations omitted); *accord Net MoneyIN v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

A 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." We resolve the question of obviousness 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 skill in the art; and (4) if in evidence, objective evidence of nonobviousness, i.e., secondary considerations.[9] *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

1. Level of Skill in the Art

Citing to the testimony of Dr. Sichitiu, Petitioner contends that a person of ordinary skill in the art "would have had at least a Bachelor's degree in Optical, Electrical, Computer, and/or Network Engineering (or related subject matter), and two to three years of relevant industry experience, or the equivalent thereof." Pet. 18 (citing Ex. 1002 ¶¶ 99–104). Patent Owner takes no position with respect to Petitioner's proposal and

[9] The record does not include allegations or evidence of objective indicia of nonobviousness.

makes no proposal of its own. Prelim. Resp. 19–20. Petitioner's proposal is reasonable in light of the descriptions in the '599 patent and prior art, and is supported by expert testimony. For purposes of this decision, we adopt Petitioner's proposed level of skill in the art.

2. Scope and Content of the Prior Art

a) Overview of Sistanizadeh

Sistanizadeh "relates to a network architecture and related communication techniques involving extending local area network technology to provide direct switching/routing and transport via fiber optic rings, over wider transport areas." Ex. 1004, 1:17–21. Figure 2, reproduced below, illustrates an example:

FIG. 2

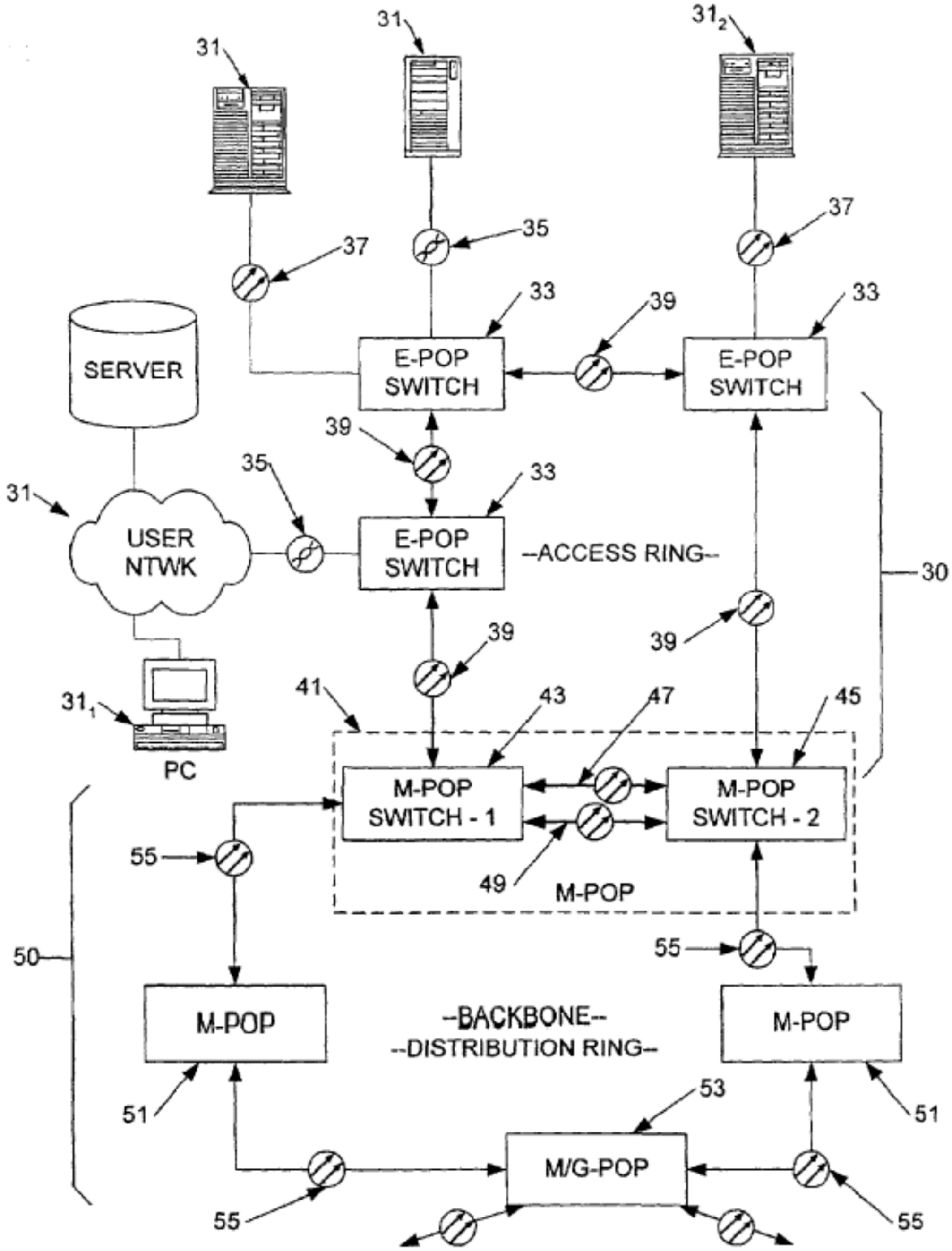

Figure 2 is a functional block diagram of a metro-area portion of a topology of a network, showing details of an access ring and a backbone distribution ring. *Id.* at 4:14–19, 6:48–49. Access ring 30 serves end-user equipment 31 within a number of buildings. *Id.* at 6:49–51. Each end user's equipment 31 connects an edge-point of presence (E-POP) switch 33 via a CAT-5 link 35 or an optical fiber link 37. *Id.* at 6:51–53. Optical fiber pairs 39 interconnect E-POP switches 33 and connect to mega-point of presence (M-POP) 41 to form a redundant two-way optical fiber ring. *Id.* at 7:45–47. The ring is redundant in that if a link to one adjacent POP fails, the other of links 39 will still allow communication to continue via the other adjacent POP. *Id.* at 7:55–57.

M-POP 41 includes first data switch 43 and second data switch 45, which are interconnected by high-speed data links 47, 49. *Id.* at 8:1–3. Data link 47 completes the loop of access ring 30, and link 49 forms an element of backbone distribution ring 50. *Id.* at 8:3–7. Backbone distribution ring 50 includes other M-POPs 51 (similar to M-POP 41) serving different access rings, and mega/giga-point of presence (M/G-POP) 53. *Id.* at 8:56–60. Switches 43, 45 can be considered as elements of access ring 30 and/or elements of backbone distribution ring 50. *Id.* at 8:7–11.

The network uses OSPF as part of the IP routing protocol at layer-3 to route data based on IP addresses contained in data packets. *Id.* at 21:25–30.

> Link State routing causes each router to build a link state packet (LSP), containing a list of its neighbors and an associated COST of using the next link path to each of those neighbors as the next hop. Each router sends its LSPs to its neighbors. Upon receipt of a neighbor's LSP, each router computes a route to each destination.

Id. at 21:30–36. "The default COST for OSPF purposes is modified according to the following approximate formula: COST=(10**6)/(Bandwidth**(½))." *Id.* at 23:1–3. OSPF runs on the M-POPs, E-POPs, and G-POPs. *Id.* at 23:32–34.

M-POPs, such as M-POP 41, advertise to each other ranges of IP addresses for the devices within access rings, such as access ring 30. *Id.* at 24:24–37. "If a route within one of the access rings 30 is unstable and repeatedly goes up and down, the aggregate range of IP addresses and the attendant route information remains the same." *Id.* at 24:38–41. Thus, if a link in access ring 30 is unstable, the aggregate range and, thus, the attendant route information for access ring 30, stays the same and M-POP 41 does not advertise any change. *Id.* at 24:41–47.

b) Overview of Kalmanek

Kalmanek describes "an efficient architecture for routing in a very large autonomous system where many of the layer 3 routers are attached to a common connection-oriented layer 2 subnetwork, such as an ATM[[10]] network." Ex. 1006, Abst. Figure 1, reproduced below, illustrates an example:

[10] "Asynchronous Transfer Mode. A network technology based on transferring data in cells or packets of a fixed size." Ex. 1001, 1:17–19.

FIG. 1

100

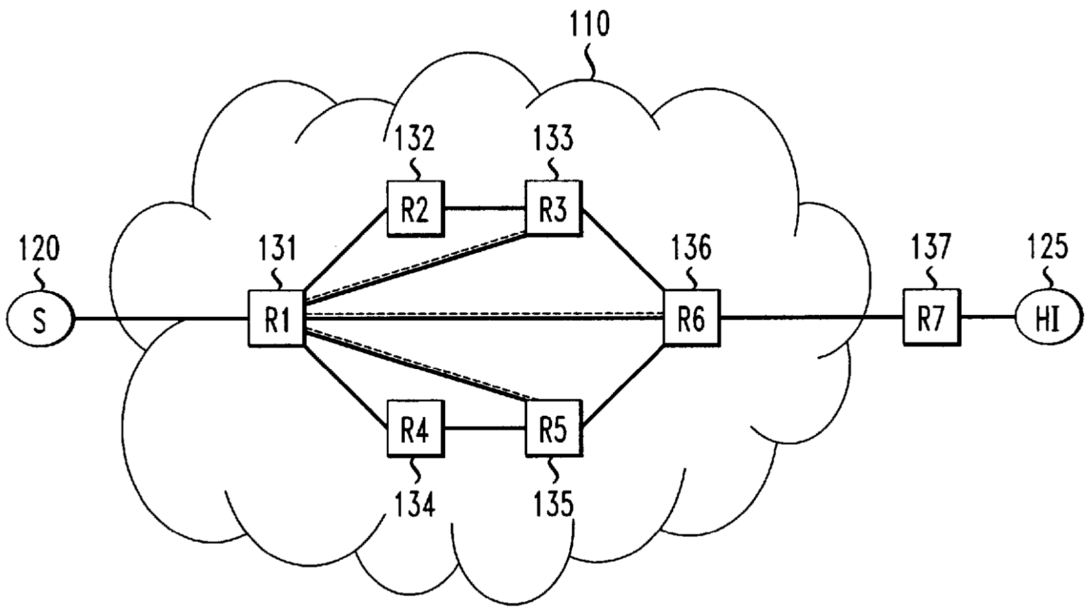

Figure 1 is a diagram of communication network 100. *Id.* at 3:31–32, 3:66–67. In Figure 1, permanent virtual circuits (PVC),[11] represented by dark lines between R1 131 and R2 132; between R2 132 and R3 133; and between R3 133 and R6 136, are configured between routers to ensure that the routers in an OSPF area are fully connected. *Id.* at 4:25–31. The routers run a conventional neighborhood protocol on the PVCs to ensure that the connections are maintained and report only correctly functioning links to a distributed topology calculation. *Id.* at 4:40–43. The dark lines define the topology available to non-shortcut routing (also referred to as "red links" or "red paths," although the reference does not include color annotation). *Id.* at 4:47–50. The shortest paths on the non-shortcut network can be calculated using conventional OSPF mechanisms. *Id.* at 4:50–52.

[11] According to Kalmanek, "switched virtual circuits (SVCs) are utilized instead of PVCs, so that pre-configuration becomes a layer 3 responsibility." *Id.* at 4:63–65.

For each destination address range, each router maintains an entry for a normal OSPF "next hop" using the red paths and an entry for a potential shortcut node closer to the destination than the normal next hop. *Id.* at 5:12–18. A shortcut is enabled by creating an SVC, after which the forwarding process uses the shortcut next hop rather than the normal next hop until either a topology change has rendered the shortcut invalid or until the source of the communications determines that there is insufficient traffic to warrant continued use of the SVC. *Id.* at 5:40–45.

3. *Petitioner's Allegations of Anticipation by Sistanizadeh*

The preamble of claim 32 recites "[a] network routing system for obtaining ingress from an external layer-3 network to a layer-2 ring network to reach nodes thereof."[12] Petitioner contends that Sistanizadeh's access ring 30 is a layer-2 ring network and backbone distribution ring 50 is an external layer-3 network. Pet. 20 (citing Ex. 1004, 6:48–8:11, 8:61–9:18; Ex. 1002 ¶ 105), 42–45 (citing Ex. 1004, 2:24–26, 3:7–26, 4:66–5:15, 5:33–48, 6:48–8:11, 9:5–18, 13:27–35; Ex. 1002 ¶¶ 127–130). Petitioner provides only conclusory argument supporting these allegations, and Dr. Sichitiu in essence copies this conclusory argument in his testimony. Pet. 19–20, 42–45; Ex. 1002 ¶¶ 104–105, 127–130. The evidence suggests that backbone

[12] Neither party takes a firm position as to whether the preamble of claim 32 is limiting. However, the preamble provides antecedent basis for at least "said ring network" referenced in the body of the claim. Petitioner's claim chart also maps the same backbone distribution ring 50 of Sistanizadeh to both the "external layer-3 network" of the preamble and "external elements of a data network" recited in the body of the claim, suggesting that Petitioner finds this additional antecedent basis in claim 32's preamble. Pet. 42–45, 48–50. Thus, we treat the preamble as limiting at least as to these two features of claim 32.

distribution ring 50 is a layer-3 network, as it uses OSPF, a layer-3 routing protocol.[13] Ex. 1004, 3:20–21, 11:16–22. However, backbone distribution ring 50 can also implement layer-2 protocols such as SONET. *Id.* at 9:5–18.

As to access ring 30 (the alleged layer-2 ring network), in one of Petitioner's cites (Pet. 45), Sistanizadeh states

> The data switches, for example the switches 33, 43 and 45 in the E-POPs and M-POPs switch Ethernet frames on and off the rings and through the rings based on Layer 2 functionalities. The inventive network utilizes IEEE 802.1d as part of the Ethernet protocol, at the L2 or MAC layer of the protocol stack.

Ex. 1004, 13:27–32. This is evidence that access ring 30 performs some layer-2 functionality. However, access ring 30 also executes layer-3 protocols such as OSPF. *Id.* at 3:14–16, 9:25–30, 23:32–33 ("OSPF runs on the BlackDiamond switches (M-POPs) and on the Summit switches (E-POPs)."). Thus, access ring 30 might be better characterized as a layer-3 ring network rather than a layer-2 network. According to Sistanizadeh, "[t]he various POPs provide switching at protocol Layer 2 as well as routing at protocol Layer 3." *Id.* at 5:62–63.

Petitioner has provided no meaningful argument or testimony from which we can discern why it identifies access ring 30 as a layer-2 network and backbone distribution ring 50 as a layer-3 network. Petitioner's identifications appear arbitrary. We have doubts as to whether, on the record developed in the Petition, Petitioner can show that access ring 30 is a layer-2 network and backbone distribution ring 50 is an external layer-3 network.

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[13] As noted above, the '599 patent confirms that OSPF is a layer-3 protocol. Ex. 1001, 2:18–19.

Even if we assume that access ring 30 is a layer-2 ring network and backbone distribution ring 50 is an external layer-3 network, Petitioner's allegations raise additional concerns.

Claim 32 further recites "*first routers disposed in ingress nodes* of said ring network, said first routers being configured for creating entries in a host table," and "said first routers being further configured for uploading said host table to *external elements of a data network that interfaces with said ring network* via said ingress nodes." Petitioner identifies Sistanizadeh's switches 43 and 45 as "first routers disposed in ingress nodes," and M-POPs 51 and M/G-POP 53 as "external elements of a data network that interfaces with said ring network." Pet. 20, 45–47.

Claim 32 further recites

> a second router disposed in at least one of said external elements, said second router being configured for defining paths from said external elements to designated ones of said nodes of said ring network, *each of said paths leading through a selected one of said ingress nodes responsively to said metric*
>
> [and]
>
> transmitting data from network elements that are external to said ring network to at least one of said nodes *via a selected one of said paths*.

Petitioner contends that M/G-POP 53 uses OSPF to calculate routes for communication "between these networks," which we interpret to mean between access ring 30 and backbone distribution ring 50. Pet. 20. Petitioner further contends that M/G-POP 53 includes a "second router disposed in at least one of said external elements," as recited in claim 32. *Id.* at 22.

According to Petitioner, "M-POP 43 and 45 communicate the access ring 30 topology information to M/G-POP 53." *Id.* (citing Ex. 1004, 3:22–

43, 21:25–22:38). Petitioner then argues that M/G-POP 53 uses the OSPF database information to generate routes between itself and each node of access ring 30. *Id.* at 22–23 (citing Ex. 1004, 11:16–31, 21:16–60, 26:9–20; Ex. 1002 ¶ 110), 50–52. These allegations also do not appear to be supported by Sistanizadeh. Although Sistanizadeh includes the general statement that "[e]ach OSPF router maintains an identical database describing the Autonomous System's topology," Ex. 1004, 21:45–47, Sistanizadeh makes clear that M-POPs such as M-POP 41 advertise only ranges of IP addresses, such that changes within a range (e.g., changes to the topology of access ring 30) need not be advertised among the nodes of backbone distribution ring 50, *id.* at 24:24–47. Although we have considered Dr. Sichitiu's testimony, it provides little help, as it in essence copies the arguments in the Petition without meaningful additional explanation.

For its part, Patent Owner argues that each of rings 30 and 50 constitutes its own OSPF area and that OSPF is used in access ring 30 merely to load balance within that ring network rather than provide a topology of the ring network to nodes on different ring networks. Prelim. Resp. 25–26. Patent Owner's view of Sistanizadeh appears more consistent with the disclosure in that reference. *See, e.g.,* Ex. 1004, 24:24–47. Petitioner's general allegations and evidence that Sistanizadeh's various nodes use OSPF are not persuasive that the topology of access ring 30 is provided to nodes of backbone distribution ring 50 or that a node of the backbone distribution ring 50 generates routes to each node of access ring 30.

Petitioner further argues that, when M/G-POP 53 receives data intended for a node on access ring 30, it uses a corresponding route from its routing table to transmit data to the destination in access ring 30, and that this discloses "transmitting data from network elements that are external to said ring network to at least one of said nodes via a selected one of said paths," as recited in claim 32. Pet. 23–24 (citing Ex. 1004, 2:24–40, 3:7–26, 10:4–14, 21:25–22:38, 26:9–20, 30:6–11, Figs. 2, 6; Ex. 1002 ¶¶ 110–112), 53–54. As noted above, Petitioner identifies switches 43 and 45 within M-POP 41 as "ingress nodes." However, Petitioner does not appear to contend that one of switches 43 and 45 is selected, or that a route is chosen to include one or the other of switches 43 and 45, or what such a selection might be in response to. Rather, Petitioner appears to contend only that M/G-POP 53 selects a route that happens to pass through one or the other of switches 43 and 45. Pet. 51; *see also id.* at 25 ("It is axiomatic that data cannot enter access ring 30 without traversing an '*ingress node*' (*i.e.*, M-POP 43 or 45).").

Claim 32 recites "each of said paths leading through a selected one of said ingress nodes responsively to said metric." Consistent with the Specification of the '599 patent, claim 32 requires that an ingress node be selected responsively to a metric. *See, e.g.,* Ex. 1001, 4:16–27. Petitioner (Pet. 21–22, 47) contends that a metric is disclosed in Sistanizadeh's description that "Link State routing causes each router to build a link state packet (LSP) containing a list of its neighbors and an associated COST of using the next link path to each of those neighbors as the next hop." Ex. 1004, 21:30–34.[14] However, Petitioner does not point to persuasive evidence (or even appear to argue) that M/G-POP 53 selects one or the other

[14] Petitioner cites to Exhibit 1004, 21:43–59. However, the language quoted in the Petition corresponds to Exhibit 1004, 21:30–34. We understand Petitioner's citation to be a typographical error.

of switches 43 and 45 in a route (or selects a route that includes one or the other of switches 43 and 45) based on the associated COST[15] of using that particular alleged ingress node. Accordingly, Petitioner has not shown that Sistanizadeh discloses "a second router disposed in at least one of said external elements, said second router being configured for defining paths from said external elements to designated ones of said nodes of said ring network, each of said paths leading through a selected one of said ingress nodes responsively to said metric" and "transmitting data from network elements that are external to said ring network to at least one of said nodes via a selected one of said paths," as recited in claim 32.

For these reasons, Petitioner has not shown that there is a reasonable likelihood that it would prevail with respect to claim 32 as anticipated by Sistanizadeh. Claims 34, 40, and 41 depend from claim 32. Petitioner's arguments and evidence for these dependent claims (Pet. 55–58) do not cure the deficiencies noted above for claim 32. Accordingly, Petitioner has not shown that there is a reasonable likelihood that it would prevail with respect to claims 34, 40, and 41 as anticipated by Sistanizadeh.

4. Petitioner's Allegations of Obviousness over Sistanizadeh

Petitioner contends that "it would have been obvious to a POSITA to modify Sistanizadeh such that M/G-POP 53 '*select*[s] *one of*' M-POP 43 or

[15] As noted above, Sistanizadeh describes COST in terms of bandwidth. Ex. 1004, 23:1–3. Patent Owner argues that cost evaluated in terms of bandwidth does not correspond to the "metric" recited in claim 32, which Patent Owner contends "is determined responsively to a number of hops between the ingress nodes and the respective one of the nodes." Prelim. Resp. 29–30. For the reasons given in Section II.A.1, we disagree that Sistanizadeh's COST is inconsistent with the claimed "metric."

45 (‘*ingress nodes*’) corresponding to the ‘COST’ (‘*responsively to said metric*’).” Pet. 25 (alteration by Petitioner).[16] Specifically, Petitioner argues, a skilled artisan “would have modified Sistanizadeh’s ‘COST’ to reflect the number of spans between nodes, rather than having ‘COST’ associated with bandwidth as disclosed in the reference.” *Id.* at 25–26. Petitioner argues that, according to the modified algorithm, M/G-POP 53 would select a least-cost route on a node-by-node basis according to each node’s cost, and that the result would be selecting an ingress node from between M-POP 43 and 45 responsively to the number of spans. *Id.* at 26–27.

Petitioner contends that Sistanizadeh “strongly infers” this modification when it describes that the “default COST for OSPF purposes is modified” to be in terms of bandwidth. Pet. 27 (citing Ex. 1004, 23:1–39). According to Petitioner, “this formula could be similarly modified to prioritize other ‘COSTs,’ *e.g.*, number of spans.” *Id.* Petitioner argues that this would have been “more efficient.” *Id.* (citing Ex. 1002 ¶¶ 171–174). Dr. Sichitiu testifies, in conclusory fashion, that minimizing delays would be a priority and that optimizing for the number of spans would optimize for other aspects such as delay, bandwidth, and reliability. Ex. 1002 ¶ 173. However, the conclusory nature of the testimony, and the lack of an

[16] Patent Owner complains that the Petition “presents a mishmash claim chart that is indiscernible and indecipherable . . . as to what the actual theories are.” Prelim. Resp. 39 n.1. We agree that the Petition’s combination of its anticipation and obviousness theories into one claim chart with few helpful guideposts results in a set of theories that is not a model of clarity. Nevertheless, we focus on the theory presented in the Petition that would most closely address the deficiencies noted above for Petitioner’s anticipation theory.

explanation of the basis for it, renders the testimony less helpful. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Petitioner next argues that selecting an optimal ingress node was recognized in the art as a problem and that modifying COST to represent number of spans was a known technique that would have predictably addressed this problem. Pet. 28–29 (citing Ex. 1002 ¶¶ 162–173, 175–177). Petitioner argues that this combination "would have predictably resulted in M/G-POP 53 consistently '*select*[ing]' either M-POP 43 or 45 as the '*ingress node*' for each 'calculated' route according to the constituent 'COST' ('*responsively to said metric*')." *Id.* (alteration by Patent Owner). Dr. Sichitiu's testimony that selecting an optimal ingress node was a recognized problem is conclusory and does not identify a basis. Ex. 1002 ¶ 176. We agree with Patent Owner (Prelim. Resp. 28) that Petitioner's argument and testimony suffer from hindsight bias. Moreover, Petitioner does not provide meaningful explanation as to why this combination would have predictably resulted in M/G-POP 53 selecting either M-POP 43 or 45 as the ingress node. As Patent Owner observes, "Petitioner fails to address ***how*** a POSITA would reconfigure Sistanizadeh and maintain its particularized network to stay operable." Prelim. Resp. 31.

Finally, Petitioner argues that it would have been obvious to try representing COST as a number of spans, which Petitioner argues is one of a finite number of well-known network attributes. Pet. 29 (citing Ex. 1002 ¶¶ 178–182). According to Petitioner, "this modification would result in M/G-POP 53 '*select*[ing]' either M-POP 43 or 45 as the '*ingress node*' for each 'route' ('*paths*'), 'responsively to' the 'COST' ('*metric*')." *Id.*

(alternation by Patent Owner). Dr. Sichitiu essentially repeats these arguments in his testimony, without identifying a basis for his testimony. Ex. 1002 ¶¶ 178–182. As with its argument above, Petitioner again does not provide meaningful explanation as to why this combination would have resulted in M/G-POP 53 selecting either M-POP 43 or 45 as the ingress node.

In sum, none of Petitioner's proposed reasons to modify Sistanizadeh is persuasive, and Petitioner does not adequately explain how a skilled artisan would have modified Sistanizadeh to yield the claimed invention. Accordingly, Petitioner has not shown that there is a reasonable likelihood that it would prevail with respect to claims 32, 34, 40, and 41 as obvious over Sistanizadeh.

5. Petitioner's Allegations of Obviousness over Sistanizadeh and Kalmanek

Petitioner asserts a combination of Sistanizadeh and Kalmanek against claim 32 "in the event Patent Owner argues that this limitation requires '*select*[ing]' a '*path*' from among <u>multiple</u> '*paths*' between M/G-POP 53 and <u>any single node</u> of access ring 30," and "[i]n the event that Patent Owner argues that 32.iv requires '*selecting*' <u>a '*path*'</u> from among <u>multiple possible '*paths*' to an individual node</u>." Pet. 36 (first alteration by Petitioner), 41. *See also id.* at 52, 55. Petitioner also asserts this combination "[i]n the event Patent Owner argues that Sistanizadeh's 'database' (and its constituent

LSAs) identifies 'neighbors' for each node of access ring 30, but does not expressly include '*an address*.'" *Id.* at 47.[17]

As explained in Sections II.B.3–II.B.4 above, we find that Petitioner has not shown sufficiently that the following limitation of claim 32 is disclosed or taught in Sistanizadeh (alone or modified by a skilled artisan): "said second router being configured for defining paths from said external elements to designated ones of said nodes of said ring network, *each of said paths leading through a selected one of said ingress nodes responsively to said metric*." Petitioner does not contend that Kalmanek teaches this limitation. Thus, Petitioner has not shown that Kalmanek cures the deficiencies noted above for Petitioner's grounds based on Sistanizadeh alone. Accordingly, Petitioner has not shown that there is a reasonable likelihood that it would prevail with respect to claims 32, 34, 40, and 41 as obvious over Sistanizadeh and Kalmanek.

[17] As noted above, Petitioner's inclusion of alternative grounds in a single claim chart results in allegations that are less than clear. Here, it is further unclear whether Petitioner seeks to combine Sistanizadeh with Kalmanek, or whether Petitioner seeks to first modify Sistanizadeh, as in its first obviousness ground, and then add teachings from Kalmanek. Petitioner's arguments in its "Obviousness rationales" section of the Petition (Pet. 35–42) suggest that its obviousness grounds are in the alternative, and that Petitioner is not arguing that a skilled artisan would first have modified Sistanizadeh and then added teachings from Kalmanek. Nevertheless, it is Petitioner's burden to identify how the challenged claims are unpatentable over the prior art. *See* 37 C.F.R. § 42.104(b)(4).

C. Fan Grounds

Petitioner contends that claims 47, 49, 53, and 54 are anticipated by Fan, would have been obvious over Fan, and would have been obvious over Fan and Kalmanek. Pet. 73–85.

1. Scope and Content of the Prior Art—Overview of Fan

Fan is directed to "an automatic network topology identification technique." Ex. 1005, 1:8–10. Figure 1, reproduced below, illustrates an example:

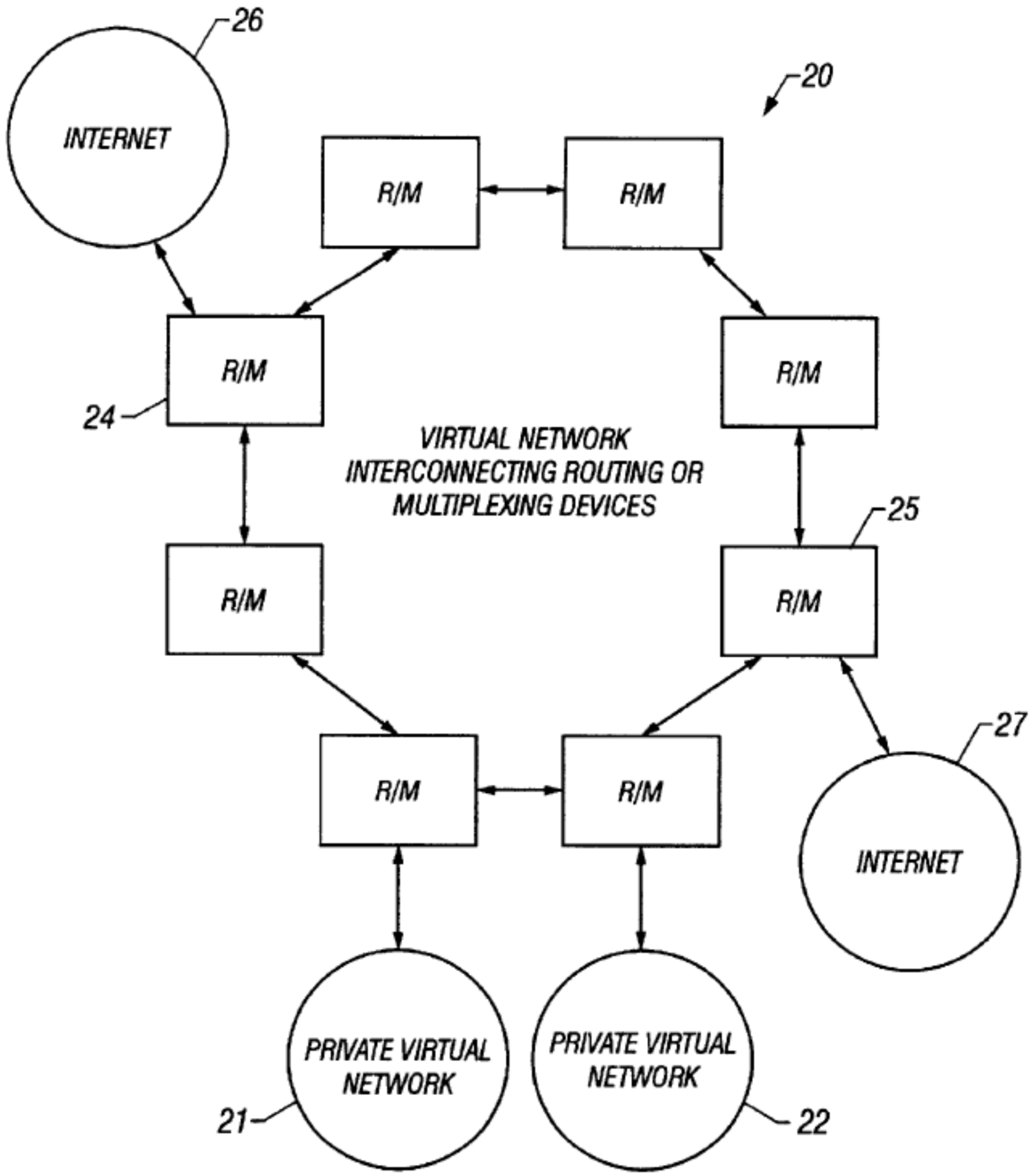

FIG. 1

Figure 1 is a block diagram of interconnected virtual networks. *Id.* at 4:15–16.

Virtual network 20 (e.g., a metropolitan area fiber ring) interconnects high-speed routing/multiplexing (R/M) devices/nodes. *Id.* at 5:19–22. R/M nodes 24 and 25 connect to open, public internets 26 and 27, respectively. *Id.* at 5:26–27. Internets 26 and 27 "are large, constantly changing, and composed of many independent and diverse modules." *Id.* at 5:27–29. According to Fan,

> Packets passed within a single virtual network 20–22 can be addressed using compressed addressing (short addresses) to increase data-carrying efficiency. Packets that leave the virtual network 20–22 will have their virtual network (short) addresses stripped or replaced with externally valid (long) addresses. In the event of virtual network reconfiguration, such as the combining of metropolitan area fiber rings, it must be possible for devices in the virtual network to simultaneously understand both short and long addresses to facilitate management and reconfiguration of such networks.

Id. at 5:32–41.

To address this issue, "nodes within the virtual network can choose to use short addresses for certain classes of traffic under certain conditions, and long addresses for the same or other classes of traffic under other conditions." *Id.* at 5:46–49. Specifically, "[a] possible set of rules could include use of short addresses for data packets when the virtual network topology is stable under some criterion and use of long addresses for control packets under all conditions and for data packets when the virtual network topology is in flux." *Id.* at 5:49–54.

Fan describes an example of the system behavior when packets from inside virtual network 20 are transmitted outside the virtual network:

> An original packet generated at a node within the virtual network contains the long source and destination addresses. This original packet is typically output from a tributary interface card within a node. A packet processor within the

> node receives the original packet and, using a look-up table, identifies the corresponding short source address, replaces the long source address in the header with the short address, and identifies the address type. This also may be done with the destination address if appropriate. The packet with the short address in the header is then forwarded around the virtual network to the node that interfaces with the external network. At this point, the short address must be converted into the long address before transmitting the packet outside of the virtual network. To this end, a packet processor in the interface node looks up the corresponding long address and replaces the header containing the short address with a header containing the long address.
>
> The resulting packet is then forwarded outside the virtual network. Thus, while the packet is being transmitted around the virtual network, the size of the packet is reduced, effectively increasing the capacity of the virtual network.

Id. at 7:7–32.

2. *Petitioner's Allegations of Anticipation by Fan*

Regarding the preamble of claim 47, Petitioner argues that Fan's virtual network 20 is "a layer-2 ring network" and internets 26 and 27 are "an external layer-3 network" (as noted above, Petitioner argues that they are "external Layer-3 networks").[18] Pet. 73–74 (citing Ex. 1005, 5:15–6:67, 7:12–8:18, 16:9–13). According to Petitioner, when Fan forwards data from virtual network 20 to internets 26 and 27 via nodes 24 and 25, respectively, Fan "obtain[s] egress from a layer-2 ring network to an external layer-3

[18] Neither party takes a firm position as to whether the preamble of claim 47 is limiting. However, the preamble provides antecedent basis for at least "said ring network" and "said external layer-3 network" referenced in the body of the claim. Thus, we treat the preamble as limiting at least as to these two features of claim 47.

network." *Id.* at 74–75 (citing Ex. 1005, 3:58–63, 5:27–28, 6:64–67, 7:1–30, 16:9–13).

Claim limitation 47.ii recites "defining paths from said nodes through egress nodes of said ring network to external elements in said external layer-3 network." For this limitation, Petitioner contends that Fan discloses computing routes from nodes on virtual network 20 to destination nodes on internets 26 and 27, which Petitioner characterizes as "external networks." Pet. 77–78 (citing Ex. 1005, 3:58–63, 5:27–28, 7:4–30, 16:9–67, Figs. 1, 3). Petitioner contends that nodes 24 and 25 are "egress nodes" that connect network 20 to internets 26 and 27. *Id.* at 58 (citing Ex. 1005, 5:15–31, 6:64–7:30), 64. Dr. Sichitiu largely repeats these arguments in his testimony. Ex. 1002 ¶¶ 261–265.

As to claim limitation 47.iii, "selecting one of said paths responsively to said metric," Petitioner argues that Fan includes a host table with entries that include addresses and corresponding distances to nodes 24 and 25, the alleged egress nodes. Pet. 60–62 (citing Ex. 1005, 8:1–3, 13:59–14:7, 15:53–16:67, Figs. 7–8), 79 (citing Ex. 1005, 2:42–45, 5:12–50, 8:14–21, 8:63–9:51, 10:22–30, 12:8–42, 15:53–16:8, 16:60–67). Petitioner contends that Figures 7 and 8 of Fan show a host table with ingress and egress distance metrics from a node to other nodes. *Id.*

Patent Owner argues that Fan discloses only a singular connection from a node to an external network, and the two egress points depicted in Figure 1 of Fan lead to separate external networks. Prelim. Resp. 34. According to Patent Owner, because Fan only discloses one egress point from node 24 or 25 to internet 26 or 27, respectively, those paths are not defined responsively to a metric. *Id.* at 35. As to Figures 7 and 8 of Fan, Patent Owner argues that their egress mappings pertain to devices within the mesh network showing in Figure 7 and not to defining paths from a ring network to external elements in an external layer-3 network. *Id*. at 36–38. Patent Owner argues "[b]ecause Fan is not defining paths through egress nodes of said ring network to external elements in said external layer-3 network, Petitioner cannot show that the selecting one of said paths is responsively to said metric." *Id.* at 38.

We agree with Patent Owner. Petitioner has not shown sufficiently that Fan discloses "defining paths from said nodes through egress nodes of said ring network to external elements in said layer-3 network." Petitioner, in essence, contends that Fan's description of sending data from inside virtual network 20 to either internet 26 or 27, each via a single egress node 24 or 25, discloses this limitation. Petitioner implicitly contends that "an external layer-3 network" and "said external layer-3 network" means one or more external layer-3 networks, and that limitation 47.ii is satisfied by defining paths from Fan's virtual network to external elements in two different external networks via two egress nodes. As explained in Section II.A.2 above, "an external layer-3 network" and "said external layer-3 network" refers to a single network, not one or more networks. Thus, limitation 47.ii requires defining paths from nodes of the layer-2 ring network through more than one egress node to external elements in the same layer-3 network. Petitioner has not shown that Fan discloses this limitation.

Claims 49, 53, and 54 depend from claim 47. Petitioner's arguments and evidence for these dependent claims (Pet. 82–85) do not cure the deficiencies in its arguments and evidence for claim 47.

Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to claims 47, 49, 53, and 54 as anticipated by Fan.

3. Petitioner's Allegations of Obviousness over Fan

Petitioner argues obviousness based on Fan alone "[i]n the event Patent Owner argues that Fan uses the 'Egress Distance' ('*metric*') for '*defining*,' but not '*selecting*' the 'route' ('*path*')." Pet. 66; *see also id.* at 79 ("In the event Patent Owner argues that Fan '*defin*[es]' but does not '*select*[] [a] *path*[]' '*responsively to said metric*,' this would have been obvious to a POSITA." (alterations by Petitioner)). Patent Owner does not argue, and we do not address, whether Fan discloses using an egress distance for defining but not selecting a path. Accordingly, it is not necessary to reach Petitioner's additional arguments regarding how a skilled artisan might have modified Fan.

In any case, Petitioner does not argue that its obviousness evidence cures the above-noted deficiencies in its argument and evidence for claim 47 in its anticipation ground. Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to claims 47, 49, 53, and 54 as obvious over Fan.

4. Petitioner's Allegations of Obviousness over Fan and Kalmanek

Petitioner argues obviousness based on Fan and Kalmanek "in the event that Patent Owner argues that this claim requires '*defining*' and/or '*selecting*' <u>multiple routes</u> ('*paths*') <u>from each node</u> ('*designated ones*') of virtual network 20 to internets 26 and 27." Pet. 71. Patent Owner does not argue that Fan fails to show defining or selecting multiple routes from each node of a virtual network to internets 26 and 27. Accordingly, it is not necessary to reach Petitioner's additional arguments regarding how a skilled artisan might have combined the teachings of Fan and Kalmanek.

In any case, Petitioner does not argue that its obviousness evidence cures the above-noted deficiencies in its argument and evidence for claim 47 in its anticipation ground. Accordingly, Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to claims 47, 49, 53, and 54 as obvious over Fan and Kalmanek.

III. CONCLUSION

Petitioner has not shown a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is denied as to claims 32, 34, 40, 41, 47, 49, 53, and 54 of the ’599 patent.

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