

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARISTA NETWORKS, INC.,
Petitioner,

v.

CORRIGENT CORPORATION,
Patent Owner.

IPR2023-00839

U.S. Patent No. 9,118,602

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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PETITIONER’S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 9,118,602 (the '602 Patent)
1002	Prosecution History of the '602 Patent
1003	Expert Declaration of Dr. Paul Min
1004	Curriculum Vitae for Dr. Paul Min
1005	RESERVED
1006	U.S. Patent No. 7,466,697 (“Raz”)
1007	U.S. Patent No. 7,277,386 (“Ferguson”)
1008	Request for Comments 3031, <i>Multiprotocol Label Switching Architecture</i> , Rosen, E. et al., January 2001 (“RFC 3031”)
1009	Nadeau, Thomas D., <i>Multi-Protocol Label Switching, MPLS Network Management</i> , 2003
1010	Request for Comments 3209, <i>RSVP-TE: Extensions to RSVP for LSP Tunnels</i> , Awduche, D. et al., December 2001 (“RFC3209”)
1011	RESERVED
1012	RESERVED
1013	RESERVED
1014	RESERVED
1015	Complaint, Docket No. 1 in <i>Corrigent Corp. v. Arista Networks, Inc.</i> , Case No. 1:22-cv-497 (D. Del.)
1016	Docket Report for <i>Corrigent Corp. v. Arista Networks, Inc.</i> , Case No. 1:22-cv-497 (D. Del.) as of January 2, 2023
1017	RESERVED
1018	U.S. Patent No. 6,499,061 (“Benayoun”)
1019	U.S. Patent No. 7,606,235 (“Ayyangar”)
1020	Request for Comments 1583, <i>OSPF Version 2</i> , Moy, J. et al., March 1994 (“RFC 1583”)
1021	U.S. Patent No. 8,312,145 (“Rabie”)

Exhibit No.	Description
1022	<i>Corrigent Corp. v. Dell Technologies et al.</i> , No. 1:22-cv-00496 (D. Del.) Docket
1023	<i>Corrigent Corp. v. Cisco Systems, Inc.</i> , No. 6:22-cv-00396 (W.D. Tex.) Docket
1024	<i>Cisco Systems, Inc. v. Corrigent Corp.</i> , IPR2023-00447, Paper 1 (Jan. 11, 2023)
1025	Yan, Peter Y., Soo Kim, Kyeong, and Min, Paul S., <i>Multi-Channel Deflection Crossbar (MCDC): A VLSI Optimized Architecture for Multi-Channel ATM Switching</i> , 1997
1026	U.S. Patent No. 5,440,549 (“Min”)
1027	U.S. Patent No. 6,128,292 (“Kim”)
1028	Declaration of Dr. Samrat Bhattacharjee, dated January 9, 2023
1029	Claim Construction Order, Docket No. 69 in <i>Corrigent Corp. v. Cisco Systems, Inc.</i> , Case No. 6:22-cv-396 (W.D. Tex.)
1030	District of Delaware Statistics (Docket Navigator)
1031	Western District of Texas Statistics (Docket Navigator)
1032	Burgess Declaration ISO PHV Motion
1033[NEW]	Link Aggregation, 802.3ad, 2000
1034[NEW]	Reply Expert Declaration of Dr. Paul Min
1035[NEW]	Open Systems Interconnection – Model and Notation, International Telecommunication Union, 1994
1036[NEW]	Deposition Transcript of George N. Rouskas in <i>Cisco Systems, Inc. v. Corrigent Corp.</i> , IPR2023-00447

I. Introduction

The Petition demonstrates that all claims of the '602 Patent are unpatentable in view of the combination of RFC3209 and Raz (Ground 1), and additionally with Ferguson (Ground 2). PO argues that Raz does not disclose the claimed LAG based on its narrow reading of what comprises a LAG, a reading not supported by the '602 Patent or the Link Aggregation standard. But even under PO's reading of what comprises a LAG, Raz discloses or renders obvious the claimed assignment of a LAG port as claimed by the '602 Patent, because Raz teaches selection of one subport out of an aggregation of subports in order to reserve the subport's bandwidth to a Label Switched Path ("LSP"), and the combination of Raz and RFC3209 extends this teaching to a tunnel between Label Switching Routers. PO's arguments attacking the application of Raz's subport assignment mechanism to RFC3209, also fail because they (1) ignore Raz's teachings disclosing compatibility with RFC3209, (2) fail to understand what Raz teaches, and (3) mischaracterize the proposed combination. With respect to Ground 2, PO again mischaracterizes the combination and disregards clear teachings from RFC3209.

II. Claim Construction

Both Petitioner and PO agree that no claim construction is required in this proceeding. POR at 3; see Paper 2 at 4.

III. Analysis

A. Ground 1: RFC3209 in View of Raz Renders Claims 1-26 Obvious

1. Raz Teaches or Renders Obvious a “LAG”

As the Petition demonstrates, contrary to PO’s argument, Raz discloses or renders obvious the claimed LAG (“Link Aggregation Group”), and it would have been obvious to combine its teachings regarding a LAG with the system described by RFC3209. EX1034, ¶¶11-31.

Raz discloses an LSR (“Label Switched Router”) provisioning an LSP (“Label Switched Path”) by assigning a particular subport of an aggregated group of ports to the LSP. Pet., 23. As Petitioner’s expert demonstrated, a POSITA would have understood Raz’s disclosure of subports to be a link aggregation group (“LAG”). EX1003, ¶¶26-28, 64-69, 88-91, 96-99. “The specification of Raz explains that the link aggregation is used to transport a high-speed packet stream through a plurality of subports of lesser speed within an LSR.” EX1003, ¶96 (citing EX1006, 14:19-22 (Claim 1)). Specifically, “‘the high speed interface (e.g., 10G) may be trunked into any number of individual subports.’” Pet., 18 (quoting EX1006, 7:7-16). Raz notes that these subports are a logically associated group of ports trunked from the high-speed interface. EX1003, ¶¶64, 66, 96.

A POSITA would understand that Raz’s associated group of subports are a LAG. *Id.* The Ethernet LAG standards-defining document (802.3ad) explains a LAG is a binding of ports to an Aggregator: “[t]he Aggregator binds to one or more *ports*

within a System.” EX1033, §43.2.1. Throughout, LAG implementation relies on the bound *ports*. EX1033, §43.3.4, §43.3.5 (“the ability of one *port* to aggregate with another . . .”), §43.3.7 (“[e]ach *port* is selected for membership in the Link Aggregation Group.”). Petitioner’s expert explained during deposition and in his supplemental declaration that this is because link aggregation occurs at the MAC layer, *inside of* a switch, and not at the physical layer where the links reside. EX1034, ¶¶11-18; EX2013, 45:13-22. Raz teaches pairs of aggregated ports combined in parallel in order to increase the bandwidth that can be supported at either side of a 10G link and thus that can be supported by the link itself. Pet., 6, 17-18; EX1006, 1:40-59 (“A problem arises[] when the aggregate link speeds exceed the capacity of the internal [processing]. . . . One solution[] is to split the input packet stream into smaller bandwidth links. . . . There is thus a need for a forwarding and provisioning mechanism that enables a high speed packet stream to be processed by multiple processors that operate at a slower rate tha[n] the inbound packet stream.”), EX1003, ¶¶64, 85, 96; EX1034, ¶¶19-21. Raz’s subports provide multiple 1G pathways for handling packet streams and are logically associated and treated as a single aggregated 10G pathway. EX1034, ¶¶19-21; EX1006, 7:7-16 (“10G interface that is composed of ten individual 1G packet streams”). This is a LAG. EX1034, ¶¶12, 17-22, 29-30 (explaining that there is no conflict between Raz’s “multiplexing” and LAG as PO asserts).

PO's proposal that a LAG exclusively comprises links "between" LSRs is overly limiting, because 802.3ad situates implementation on the MAC layer within a switch and confirms that LAG may be implemented *within* a device. EX1033, §1.4 (describing that an aggregated link occurs between two Aggregated Systems, and "a physical device may comprise...more than one Aggregation System."); EX2013, 41:22-42:7, 43:22-44:12, 47:5-8; EX1003, ¶64; EX1034, ¶¶23-24. Raz's associated group of subports are a LAG, as confirmed by 802.3ad and Petitioner's expert. EX1034, ¶¶17-24. PO's restrictive view of a LAG is not supported by 802.3ad, and even PO's expert testified that the link aggregation "standard is well known" and "there's [sic] multiple implementations. . ." EX1036, 17:10-13.

PO's theory that Raz's subports are not actually *ports*, but merely *processors* (POR, 9) fares no better. The subports are described as 1G *interfaces* trunked from a 10G *interface*, which a POSITA would have understood refers to ports. EX1006, 7:7-16 ("the high speed interface (e.g., 10G) may be trunked into any number of individual subports."); EX1034, ¶31. Further, PO misunderstands the disclosure: ports contain or are served by processors; Raz itself notes that there are network processors which *handle* the traffic through its subports: "each subport [may be] handled by a different network processor;" alternatively, "network processors [may] handle two subports each." EX1006, 11:24-29; EX1034, ¶31. A POSITA would have understood that subports are ports that are served by network processors, not

simply network processors themselves. EX1034, ¶31.

2. PO's Arguments Manufactures Claim Limitations and is Inconsistent with the Claims of the '602 Patent

PO's argument regarding Raz's disclosure of LAG also conflicts with the '602 Patent's claims. All claims require selection of "a single physical tunnel *port of a LAG*," and further describe the selected "physical data port *in* an Ethernet Link Aggregation Group (LAG)." EX1001, Claims 1, 15, 26. That the claims of the instant patent themselves describe ports as *in* and *of* a LAG undercuts PO's arguments. Prior art references also describe LAG in terms of its ports. EX1006, 9:12-15 ("defining its *ports* ... as a single LAG"); EX1007, 1:47-52 ("aggregated *ports*"). At the time of the '602 Patent's purported invention, 'LAG' was a widely understood concept describing a logical binding of *ports*.

PO inappropriately seeks to add a limitation to the claims that would require the LAG to be "a group of links between two LSRs." POR, 7-9; *see also* POR, 26-27. But LAG does not require multiple physical links, and PO appears to fail to take into consideration the necessary *ports* of a LAG. EX1034, ¶¶12-18. 802.3ad defines an "Aggregation Link" as "[a]n instance of a MAC-Physical Layer-Medium[-]Physical Layer-MAC entity between a pair of Aggregation Systems." EX1033, §1.4. For LAG, a "link" is an instance of an entity that spans the entire path from one Aggregation System to another, starting with an aggregated group of *ports* at the MAC layer and ending at the paired aggregated group of *ports*, also at the MAC

layer. EX1034, ¶18. “[A]s for how they’re [(the packet streams)] actually being submitted across and between the two switches, two LSR switches, that is not part of the definition of link aggregation group.” EX2013, 43:22-44:12. Because LAG is defined according to bound *ports*, LAG may be implemented in many types of LSR-to-LSR connections, including ports interfacing with multiple low-speed links, or ports whose output is aggregated to a single high-speed link as taught by Raz. EX1034, ¶¶16-21.

Even under PO’s restrictive scope for a LAG, Raz (and as will be discussed later, Ferguson), disclose a LAG. The Petition demonstrates that Raz renders obvious a LAG through Raz’s express statement that ports that disaggregate to its subports may be defined as a LAG. Pet., 17-19; EX1003, ¶¶64, 96; EX2013, 43:22-44:12, 45:13-22, 46:20-47:8. Raz’s “**subports may be defined as a Link Aggregation Group (LAG):** ‘some commercially available layer 2 switches can determine the destination port for a packet destined to a LAG, ... [which] can be used for ... **defining its ports leading to the different subports as a single LAG.**’” EX1003, ¶64 (quoting EX1006, 9:9-15). As Petitioner’s expert explains, choosing a subport in this embodiment necessarily requires identification of the LAG port leading to that particular subport in order to forward the data packet to the appropriate subport. EX1034, ¶¶23-27. Thus, even assuming *arguendo* that Raz’s subports are not a LAG, Raz discloses the ports *leading* to the different subports

explicitly are. PO argues that this passage would tell a POSITA that Raz's subports are not a LAG. But PO's own expert admits that LAG is compatible with Raz's subports, having testified that for Raz "[the inventor] knew how to repurpose a LAG switch to use inside []his invention," and "[Raz]'s talking about Layer 2 LAGs *that he proposes to use* as part of one embodiment." EX1036, 33:5-8, 33:25-34:2; EX1034, ¶27-28; EX1006, 9:18-22, 9:41-10:4.

Therefore, Raz discloses or renders obvious "assigning . . . a single physical tunnel port of a LAG to a network tunnel" as required by independent claims 1, 15, and 26, even under PO's narrow reading of LAG. EX1034, ¶¶11-31.

3. The Combination of RFC3209 with Raz Renders the Limitations of Claim 1 Obvious

(a) The RFC3209 and Raz Combination Renders Obvious Assignment and Use of a Single Physical Tunnel Port of a LAG as Recited by the Claims

A POSITA would have understood the combination of RFC3209 with Raz to disclose or render obvious "assigning and utilizing an Ethernet physical data port in an Ethernet Link Aggregation Group" (limitation [1.0]), "assigning, by a first MPLS/LAG switch, a single physical tunnel port of a LAG to a network tunnel" (limitation [1.1]), and "sending said data packet from said first MPLS/LAG switch to a second MPLS/LAG switch via said single physical tunnel port" (limitation [1.5]). Pet., 23-28; EX1003, ¶¶96-98; EX1034, ¶¶32-36. PO interprets these claim limitations restrictively based on "LAG," but as explained in the Petition and

reiterated above, RFC3209 and Raz renders the LAG port assignment and use limitations obvious even under PO's interpretation.

The Petition relies on Raz's teachings that an LSR has the capability to assign an interface of a bundle (LAG) to an LSP using RSVP with MPLS. EX1034, ¶¶33-34. As petitioner's expert explained, Raz teaches that when a subport is selected by an LSR, "[t]he selected subport is the same for both sides of a 10G link." EX1003, ¶67 (citing EX1006, 7:20). Meaning, when a given LSR chooses an input subport on which it wants to receive a data packet, that input subport is paired with an output subport on the previous LSR. Referring to Figure 3, "**LSR B decides to accept the LSP on subport 3** and thus assigns a label comprising an indication that subport 3 was selected. The label is communicated to **LSR A** which **now knows that the output subport should be subport 3 (i.e. the same subport is provisioned)**." EX1006, 7:33-38. RFC3209 teaches or renders obvious the use of RSVP with MPLS to assign an outgoing interface to an LSP. Based on these disclosures, a POSITA would have understood that it would be beneficial to allow RFC3209's outgoing interface assignment to apply in situations where there is a need to select a particular port in a bundle (or a particular link, according to PO's restrictive reading). Pet., 13-15, 27-28; EX1003, ¶¶88-92; EX1034, ¶35.

The difference between Raz (describing an LSR choosing *its receiving* subport and *the previous LSR's sending* subport) and the traffic engineering relied

upon in RFC3209 (describing the instant LSR choosing its *own* sending port) is irrelevant. EX1034, ¶¶35-36. In both references, an LSR explicitly chooses *an outgoing interface* and *assigns that interface to an LSP*. Pet., 15-17 (describing RFC3209’s disclosure of ‘next hop’ and selection of outgoing interface); EX1003, ¶¶67-68 (describing Raz’s disclosure of LSP choosing the previous hop’s outgoing interface). The Petition explains that it would have been obvious for RFC3209’s interface selection to be implemented as aggregated subports, as Raz teaches. That Raz discloses that a downstream LSR may make the subport selection, while RFC3209 uses an upstream LSR for interface selection, is irrelevant because Raz is concerned with ensuring that the LSR-to-LSR hop—as a whole—contains sufficient bandwidth and teaches that both LSRs have the same information about bandwidth availability on their paired subport resources. EX1034, ¶¶34-36. Petitioner’s expert explains that both upstream and downstream LSRs would, in that case, be capable of making the subport selection and would be compatible with RFC3209’s framework. EX1034, ¶36.

PO asserts that “a POSA would neither have been motivated to nor capable of implementing Raz’s subport provisioning mechanism between two network devices.” POR, 14. But Raz *already* discloses subport provisioning “between” two network devices: selecting both a receiving subport (of one LSR) and an outgoing subport (of the previous LSR) and assigning them to an LSP. EX1003, ¶¶89, 91. Raz

describes a given LSR's selection of the subport on which it would like to *receive* the LSP, and that this selection is mirrored "on the other side of the link," i.e., at a second LSR who's "output subport" is also chosen. EX1006, 7:20, 7:33-38; EX1003, ¶¶67-68. This is a reservation of resources from the output subport of LSR A to the receiving subport of LSR B (*i.e.*, "between" the LSRs). EX1034, ¶26, 34. The Petition and supporting declaration have demonstrated that a POSITA would have been motivated to extend RFC3209's capabilities to LAG using the teachings of Raz. It is an LSR's capability of assigning an outgoing interface (subport) to an LSP that makes it obvious to incorporate LAG subport provisioning into the conventional, well-known LSP setup process of RFC3209. Pet., 13-15; EX1003, ¶¶85-91; EX1034, ¶¶32-36.

PO complains that the Petition cites to another reference (EX1021, 'Rabie') instead of relying on the combination of Raz and RFC3209 to meet limitations [1.1] and [1.5]. POR, 36 n.12. Rabie is used to support the motivation to combine, further supporting the motivation to use Raz's ability to select a particular port of the bundled subports and apply it towards the selection of an externally facing sending port of a LAG. EX1021, Abstract, 6:58-63; EX1003, ¶¶112, 130. PO's expert also confirms this. EX1036, 17:2-13, 17:18-20 (admitting that LAG was a well-known standard with multiple implementations).

A POSITA at the time would have been aware, as supported by Rabie, that

the aggregation or bundling of ports, or links (if PO's restrictive reading is to be adopted), refers to a LAG and that this aggregation can be performed, according to one implementation, between two LSRs. EX1003, ¶¶112, 130; EX1034, ¶¶19-22. Based upon this additional foundation, the application of Raz's subport selection and assignment teachings to ports and/or the links connected to those ports would have been obvious, and a POSITA consequently would have applied Raz's teachings to RFC3209 to improve upon the disclosed traffic engineering applications. Rabie's explicit disclosure is further evidence, supported by PO's expert, of the widespread knowledge of and multiple implementations for LAG. EX1003, ¶¶88-91.

(b) RFC3209 and Raz Are Compatible and The Petition Demonstrates that their Teachings Would Have Been Readily Combined

PO argues that Raz's teachings would not have been combined with RFC3209, but PO ignores that Raz describes itself as an application of MPLS protocols and explicitly states compatibility with RFC3209's labeling protocol, RSVP-TE. A POSITA would have been motivated to improve RFC3209 according to Raz's LAG teachings. Pet., 9-15; EX1003, ¶¶83-91; EX1034, ¶¶37-38.

Both RFC3209 and Raz make use of the same network devices, label-switching routers (LSRs) performing Multi-Protocol Label Switching (MPLS). Pet., 23-24. As the Petition explains, "RFC3209 alternates between the terms 'node,' 'router,' and 'LSR,' which all refer to devices capable of performing MPLS and as

such are MPLS switches.” Pet., 20-21; see EX1003, ¶101. Raz also “discloses the use of LAG by MPLS switches.” Pet., 24 (citing EX1006, 7:7-16); EX1003, ¶¶109-110; EX1006, 6:51-54. In particular, the Petition explains that it would have been obvious to extend RFC3209’s LSR teachings to incorporate LAG-compatible LSRs, as taught by Raz. Pet., 11-13.

Contrary to PO’s arguments, *both* references explicitly describe themselves as “[e]stablishing a path, or tunnel, along nodes of an MPLS network” and “relate to correctly routing packets between a source and destination.” POR, 12. Raz’s invention is directed to improvements to bandwidth allocation along an LSP. An LSP cannot be set up without the *resources* (i.e., bandwidth to support the proposed traffic) having been *reserved* along the entire path. Pet., 13, 25. Such reservation of resources is expressly described by RFC3209 (the “Resource Reservation” network working group document for setup of LSPs). EX1010, Abstract. Raz improves upon RFC3209 to ensure that the available *resource*—bandwidth of LAG subports (the subports through which the proposed traffic must pass)—may be explicitly *reserved* by the LSRs. Both RFC3209 and Raz teach setup of LSPs by LSRs, and both are concerned with ensuring that the various hops along the LSP have sufficient bandwidth to support the proposed traffic. Pet., 25-26; EX1003 ¶85, (citing EX1006, 1:56-60, 11:3-12 (“allocating LSP bandwidth to subports”), 8:1-5 (as part of LSP setup, the LSR “executes a bandwidth allocation algorithm, described in more detail

infra, that controls the allocation of bandwidth of each subport.”)). Petitioner’s expert confirms this: “[b]oth RFC3209 and Raz are directed to a system for setup and use of label-switched paths as network tunnels in an MPLS network.” EX1003, ¶85. “Both RFC3209 and Raz discuss the advantages of using traffic engineering applications of the underlying MPLS and label signaling...” EX1003, ¶85. The Petition properly considers Raz an *application* of the traffic engineering described by RFC3209. Pet., 13-14; EX1003, ¶¶83-91. As noted, Raz explicitly describes its teachings as compatible with RSVP-TE—the title of RFC3209. Pet., 14 (citing EX1006, 5:10, 6:46-50).

PO argues that Raz is “indifferent to MPLS network engineering.” POR, 12. To the contrary, Raz explains that “the increasing use of MPLS **requires** that any solution [to the problem Raz aims to solve] be able to handle the MPLS protocol,” EX1006, 1:53-55; Pet., 13-14 (citing EX1006, 6:51-54 (“It is intended that...the present invention be implemented in network devices such as routers (e.g., LSRs in MPLS networks)”)).

PO next asserts that RFC3209 and Raz are incompatible as to their assignments and labeling protocols. But Raz and RFC3209 teach the **same labeling protocol** (RSVP in MPLS); they are not distinct or incompatible. EX1003, ¶91. Raz describes that its LSR “performs the conventional LSR functionality including the provisioning of LSPs. In particular, the CPU [of the LSR] functions to perform the

assignment of subports to LSPs in response to LSP setup requests.” EX1006, 7:65-8:13; Pet., 23. In both RFC3209 and Raz, the decision of which interface to use for the given LSP is communicated upstream “via the label that is assigned to the LSP.” This is because ***both references employ MPLS with RSVP-TE***. EX1003, ¶¶90-91; EX1034, ¶¶37.

With respect to the POR’s arguments relating to limitation [1.3], PO merely repeats arguments, again ignoring Petition’s clear motivation to combine.

(c) **The Petition Has Demonstrated a “Reasonable Expectation of Success” to the Modification of RFC3209 Based on Raz.**

The Petition and Petitioner’s expert explain why a POSITA would have reasonably expected success in modifying RFC3209 according to Raz. *Eli Lilly & Co. v. Teva Pharm. Int’l GmbH*, 8 F.4th 1331, 1345 (Fed. Cir. 2021) (reasonable expectation of success is about the expectation of success *by a POSITA*). The Petition demonstrates foundational reasoning for the proposed modifications. For example, LAG is compatible with and easily applicable to RFC3209’s framework and a POSITA would have been motivated to look to Raz to make such improvements. Pet., 14-15; EX1034, ¶¶39-40. The components of RFC3209 and Raz would be operating as described in their respective documents, at least because both RFC3209 and Raz describe the use of the same devices (LSRs) provisioning the same type of network path (LSP) and using the same labeling protocol (MPLS with

RSVP Traffic Engineering extensions) to perform bandwidth reservations. EX1003, ¶91; EX1034, ¶37, 39-40.

(d) **PO Mischaracterizes the Petition’s Combination and Relies on Reading in Limitations that Are Not Present**

The POR’s primary arguments against the combinations proposed that render obvious limitations [1.2], [1.4], and [1.5] (POR, 29, 39, 41), are repetitions of the same flawed arguments. *Supra*, §III.A.1-2.

Regarding limitation [1.2], PO’s analysis of the choice in Raz to allocate labels downstream, on-demand, using choice of receiving port, is irrelevant. It is Raz’s teaching of the *assignment of a label identifying a subport of a LAG* that the Petition incorporates into RFC3209. *Supra*, §III.A.3.(a). PO complains that Raz teaches allocating a label for the ‘wrong’ subport, but it is RFC3209, not Raz, which the Petition relies on for the allocation of a label identifying the claimed “sending” port. Pet., 29. PO reimagines the Petition’s arguments incorrectly and argues against something the Petition does not do. Limitation [1.2] requires that a given LSR creates a label identifying a subport chosen by that LSR—Raz’s explicit teachings as applied to RFC3209’s label render this limitation obvious. Pet., 29-32; EX1003, ¶117. That RFC3209 and Raz both employ MPLS with RSVP-TE signaling shows a POSITA that the proposed modification to RFC3209 is reasonable. EX1034, ¶37, 40.

With respect to limitation [1.4], PO makes the identical complaint that Raz’s

LSP identifies a “previous hop” while RFC3209 describes the “next hop.” This fails for the reasons discussed above (*supra* §III.A.3.(a)) and for the additional reason that it misrepresents the proposed combination and forgets the application of Raz to the teachings of RFC3209. This repeated misrepresentation is not surprising given that PO recycles arguments made in its Cisco IPR Response even though the Cisco IPR’s Invalidity Grounds did not include RFC3209 as part of its ground. Raz discloses that the LSR receives a data packet containing a label within which *the subport chosen by that LSR* is encoded, which is all that Petitioner relies on Raz for regarding this limitation. Petitioner has already established that “RFC3209 discloses data packets arriving from the previous hop of the LSP tunnel with the label value which was assigned by this LSR,” where the label value reflects the chosen *outgoing interface*, as RFC3209 teaches. Pet., 32-33 (citing EX1010, §2.1,§2.2). Thus, the Petition explains that it would have been obvious, given the teachings of RFC3209 and Raz, for the “data packets arriving from the previous hop of the LSP tunnel with the label value which was assigned by this LSR” (Pet., 32) to have a label value containing an encoding of *the subport chosen*, as Raz explicitly discloses *making a label with the subport serial number encoded* (Pet., 32).

With respect to limitation [1.5], PO’s complaint that “Raz’s subports cannot be the conduit ‘via’ which data is sent” first misrepresents Raz’s disclosures, as previously explained (*supra*, III.A.2) and second is another repetition of the same

failed argument regarding Raz’s “receiving” versus “sending” ports. *Supra*, III.A.3.(a). PO still ignores that the Petition relies on Raz’s subport assignment *as applied* to the framework described by RFC3209. The Petition relies on RFC3209 for the claimed sending of the data packet between the first and second LSRs via a selected port. The piece missing from RFC3209 is that a chosen interface for an LSR may be a LAG subport, and Raz discloses and provides motivation for that modification. EX1003, ¶¶90-91, 131.

Even under PO’s mischaracterization that the Petition relies, for [1.5], on Raz’s LSR’s *receiving* port being the port “via” which the data packet is sent, the Petition alternatively demonstrates that it would have been obvious to a POSITA, given Raz and RFC3209, to assign and send “via” an outgoing LAG port. Pet., 36, EX1003, ¶¶130-32 (explaining that a POSITA would have known that bundled links connect routers to each other, so it would have been obvious to employ Raz’s subport on the outgoing end of the LSR).

4. The Petition has Met its Burden For the Claimed “Mapper” and “Processor” Limitations

RFC3209 in combination with Raz render obvious the claimed “processor.” Pet., 50-51; EX1003, ¶¶184-86. Raz discloses a “network processor” which is implemented to perform the functions described therein. Pet., 51 (citing EX1003, ¶185 (“The use of a processor to perform various functionality as described in RFC3209 and Raz would have been obvious to a POSITA.”)). Petitioner has met its

burden of showing that the combination renders obvious the claimed processor.

Regarding “mapper,” PO incorrectly takes the Petition’s discussion out of context and ignores expert testimony that a POSITA would have understood the presence of the claimed “mapper” from the disclosures in RFC3209 and alternatively from the disclosures in Raz as applied to RFC3209. PO argues that “an LSR could just as well have multiple separate components” performing the functions, (POR, 48), but again ignores that the Petition presents for Ground 1 a *combination* of RFC3209 with Raz, not both references independently. The Petition states that the combination of RFC3209 with Raz render obvious a mapper, because it would have been obvious for RFC3209’s intermediate nodes to contain “a component” corresponding to the claimed “mapper.” Pet., 51. The Petition then cites to the Min Declaration, which states “to the extent not disclosed by RFC3209,” a mapper would have been obvious in view of Raz’s disclosures of a “forwarding module.” EX1003, ¶197. As Petitioner’s expert explained, “the purpose of the mapper is to receive a data packet, detect a data packet label within the data packet, and determine how to forward the data packet in accordance with the label.” EX1003, ¶197. The Petition explains, in limitations [15.5]-[15.8] and by reference to limitations [1.4] and [1.5], how a component in RFC3209’s LSR performs these functions. Pet., 51-52 (which incorporates analysis on pages 32-36); EX1003, ¶¶196-208 (which incorporates analysis in ¶¶124-134). Raz’s “forwarding module” performs these functions, and

this component would be incorporated into RFC3209's LSR according to the modifications to RFC3209 that are proposed by the Petition. EX1006, 7:39-45 (“[t]he port forwarding module in LSR B examines the label in the received packet and in response thereto forwards the packet to subport 3”). Whether the disclosure of the claimed “mapper” and its functions comes from Raz or RFC3209, the Petition argues that it would have been obvious to a POSITA for *RFC3209*'s LSRs to contain a “mapper.” EX1003, ¶¶196-208.

B. Ground 2: Obviousness of Claims 1–26 over RFC3209 in View of Raz and Ferguson

1. The Combination of RFC3209 with Raz and Ferguson Discloses LAG

To the extent not disclosed or rendered obvious by the RFC3209-Raz combination, Ferguson explicitly discloses a LAG “between” two LSRs in an MPLS network: “Ferguson discloses the utilization of an Ethernet physical data port in a LAG in an MPLS network for the purpose of communicating high-speed packet streams.” Pet., 57 (citing EX1007, 1:21-26, 1:43-53, Figs.2A-2C); EX1034, ¶¶41-43.

2. PO Ignores the Petition's Motivation to Combine

The Petition demonstrates that teachings from Ferguson would have been applied to the combination of RFC3209 and Raz. PO fundamentally misunderstands the proposed combination. The Petition is not arguing for modifying *Raz* based on Ferguson. The Petition is arguing for modifying RFC3209 to incorporate the

beneficial teachings of both Raz *and* Ferguson. Pet., 53-60; EX1003, ¶¶246, 250-51; *see also* EX1034, ¶¶45-55.

PO's arguments ignore the Petition's discussion of the motivation to combine Ferguson with RFC3209 and Raz. POR, 51-52. *Cf.* Pet., 53-56 (citing EX1003, ¶¶242-46, 250-52). PO asserts that Ferguson and Raz (ignoring RFC3209) "address different problems" and "use fundamentally different methods." POR, 55. But as explained in the Petition, all three references are directed to solving the problem of ensuring enough bandwidth is available to communicate high-speed packet streams through an MPLS network. Pet., 53-56. Raz and Ferguson additionally share similarities that would motivate a POSITA to apply their disclosures to RFC3209. For example, Ferguson, like Raz, focuses on improving the use of bandwidth when using a LAG in an MPLS network. Pet., 55-56; EX1003, ¶¶243-46. Further, like Raz, "Ferguson explains that it can 'use one or more fields directly from one or more of [the] MPLS labels' to select the path for communicating data packets." EX1003, ¶246 (citing EX1007, 8:10-12); Pet., 55. PO argues that "[u]nlike Raz, Ferguson assumes that routers have sufficient processing capacity to handle the data communications that Ferguson describes distributing." POR, 55. But Ferguson discloses that its techniques can be used both between and within routers or switches, indicating a need to ensure sufficient bandwidth *within* routers as well. EX1007, 5:61-6:9; EX1034, ¶45.

Further, PO’s argument that Ferguson differs from Raz because Ferguson distributes packets of a common LSP across multiple paths of an aggregated link is misplaced, because the relevant teaching from Ferguson is that aggregation methods can be used to increase bandwidth usage when transmitting high-speed packets between two routers or switches in a network. Pet., 55-56 (citing EX1007, 5:61-6:6; EX1003, ¶246). PO argues that Raz and Ferguson teach differing labeling techniques because Ferguson teaches that “a given router transmits a packet based on the existing label(s)” (POR, 58), but PO misunderstands that *the same is true of Raz*. Not only does Raz teach that its downstream LSR allocates a label and sends it upstream, but that the LSR receives packets upon which that label has been appended and—like Ferguson, like RFC3209’s teachings, and like every other application of MPLS—the LSR forwards the packet in accordance with that label. Pet., 16, EX1003, ¶¶86 (explaining that for an LSP, each node (LSR) allocates a label which it will use to identify how to route a packet containing that label), 115, 131; EX1034, ¶¶52-54. Raz, Ferguson, and RFC3209 are referring to the same labeling protocol. EX1034, ¶42. Moreover, Ferguson teaches aggregation techniques relevant to the RFC3209-Raz combination, regardless of the labeling protocol. Pet., 55-60; EX1003, ¶¶248-52, 262-64; EX1034, ¶¶41-45.

3. The Combination of RFC3209 with Raz and Ferguson Renders the Challenged Claims Obvious

Ferguson demonstrates that mechanisms of distributing packets across

physical interconnections between LSRs are as readily applicable to MPLS architecture as mechanisms of distributing packets across internal data paths within an LSR. Pet., 58-59. This is because ***no matter where interfaces or links are situated with respect to a given LSR, there is a need to ensure that the entire proposed path has sufficient bandwidth to support the proposed traffic.*** Pet., 10 (discussing verifying that bandwidth exists along an entire path for LSP setup). A path fails if even one interface—whether inside of an LSR or externally-facing—is unable to support its traffic. Pet., 25 (citing EX1003, ¶¶109-10). When PO states that “how packets are processed and move within a switch is different from how packet streams are communicated between switches” (POR, 66), PO fails to take into account that Raz is concerned with reserving bandwidth on *ports*, and with respect to assigning bandwidth for data transmission, the principles of port to port communication are the same whether within a switch or communicating between switches. EX1034, ¶¶51-55. Raz’s invention is not about “how packets are processed and move within a switch”—Raz says very little about a switch’s internal data paths and only mentions “switching fabric” in passing. See EX1006, 6:65-7:5. Raz, like Ferguson and RFC3209, is concerned with ensuring that bandwidth exists along an “entire path,” and in particular, Raz is concerned with ensuring that ports have sufficient bandwidth reserved. Pet., 25 (“A POSITA would have understood that a LSP tunnel’s ‘entire path’ [for which bandwidth is verified] includes the nodes that the

LSP traverses as well as the links between nodes and interfaces (i.e., ports) on each end of the links.” (citing EX1010, §§1.1, 2.2; EX1003, ¶¶109-10)).

Therefore, the Petition demonstrates that a POSITA would have understood from Ferguson—to the extent not already known—that LSPs as described by RFC3209 are capable of passing through LAGs and that there is a need for ensuring that a LAG can handle the LSP traffic. Pet., 58-60. Thus, a POSITA would have been motivated to apply Raz’s teachings expressly to ensure that when an LSP is destined for a LAG, there is sufficient bandwidth reserved on one of the LAG’s subports. *Id.* As the Petition has already demonstrated, Raz uses the conventional signaling protocol (MPLS with RSVP-TE) to assign a subport to an LSP and communicate that decision through the network in the form of an MPLS label. Pet., 13-14; *supra* §III.A.3.(b). Ferguson also confirms the applicability of Raz’s teachings to interfaces situated “between” LSRs. Pet., 56 (“the efficient use of bandwidth realized inside the LSR would also have been realized using the same techniques for communications between LSRs.”). As the Petition states, these teachings from Raz and Ferguson are incorporated “in the framework of RFC3209.” *See, e.g.*, Pet., 58, 53, 56.

Contrary to PO’s arguments, Ferguson teaches: (1) the need to have bandwidth available to an LSP on a LAG subport; and (2) that LSRs are capable of subport selection and tunneling techniques, whether done between LSRs or within

an LSR. EX1007, 1:28-42, 2:54-57. It would have been obvious to a POSITA to therefore apply the LAG within the LSR between LSRs. Pet., 54-56; EX1034, ¶¶44-55.

C. Obviousness of Dependent Claims

PO's allegations with respect to dependent claims 2-14 and 16-25 rely on its flawed arguments for independent claims 1, 15, and 26. PO does not raise any additional arguments, and consequently the combinations of RFC3209 with Raz (Ground 1) and additionally with Ferguson (Ground 2) render these claims obvious.

IV. Conclusion

Petitioner respectfully requests the Board find Claims 1–26 of the '602 Patent to be unpatentable.

Date: May 28, 2024

/Eliot D. Williams/
Eliot D. Williams (Reg. No. 50,822)
Baker Botts L.L.P.
700 K Street, N.W.
Washington, DC 20001-5692

Kurt Pankratz (Reg. No. 46,977)
Baker Botts L.L.P.
2001 Ross Avenue, Suite 900
Dallas, TX 75201-2980

Jeremy Taylor (Reg. No. 73,912)
Katherine Burgess (*Pro Hac Vice*)
Baker Botts L.L.P.
101 California Street, Suite 3200

San Francisco, CA 94111

COUNSEL FOR PETITIONER

CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e), the undersigned certifies that on May 28, 2024, a complete and entire copy of **PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE**, was served to Patent Owner via electronic mail to:

James R. Nuttall
Katherine D. Cappaert
Christopher A. Suarez
Benjamin R. Holt
Heather P. Hildreth
jnuttall@Steptoe.com
kcappaert@Steptoe.com
csuarez@Steptoe.com
bholt@Steptoe.com
hhildreth@Steptoe.com
SJCorrigentIPR@Steptoe.com

Date: May 28, 2024

/Eliot D. Williams/
Eliot D. Williams (Reg. No. 50,822)
Baker Botts L.L.P.
700 K Street, N.W.
Washington, DC 20001-5692

COUNSEL FOR PETITIONER

CERTIFICATE OF COMPLIANCE

I hereby certify that this **Petitioner's Reply to Patent Owner's Response** complies with the type-volume limitations of 37 C.F.R. § 42.24(c)(1) because it contains 5,585 words (as determined by the Microsoft Word word-processing system used to prepare the petition), excluding the parts of the reply exempted by 37 C.F.R. § 42.24(c).

Dated: May 28, 2024

/Eliot D. Williams/

Eliot D. Williams, Reg. #50,822
Baker Botts L.L.P.
700 K Street, N.W.
Washington, DC 20001-5692

Counsel for Petitioner