

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC,
Petitioner,

v.

WSOU INVESTMENTS d/b/a BRAZOS LICENSING AND
DEVELOPMENT,
Patent Owner.

Case IPR2025-00429
Patent 9,450,884

**PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 35 U.S.C. §§ 311-19 AND 37 C.F.R. § 41.100, ET SEQ.**

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EXHIBIT LIST

Exhibit No.	Exhibit Description
2001	IPR-2025-00188 ('691 Patent) Paper 6, Patent Owner's Preliminary Response
2002	IPR-2025-00188 ('691 Patent) Paper 8, Patent Owner's Request for Discretionary Denial
2003	Cisco's Unopposed Application for Extension of Time to Answer Complaint, Case No. 2:24-cv-00332 (May 14, 2024)
2004	Docket Navigator Printout, The Honorable Rodney Gilstrap Motion to Stay Pending IPR Stats
2005	Brazos's Preliminary Infringement Contentions, Case No. 2:24-cv-00332 (July 15, 2024)
2006	Cisco's Invalidity Contentions, Case No. 2:24-cv-00332 (Sept. 23, 2024)
2007	E-13 Invalidity Chart re : '884 Patent – US 7,453,804 ("Feroz")
2008	E-30 Invalidity Chart re : '884 Patent – US 8,274,887 ("Peterson")
2009	Redline of Peterson Publication and Peterson Patent
2010	US 8,274,887 ("Peterson")
2011	Vidal Memo Recission
2012	Guidance Memo on Interim Procedure Recission (March 24, 2025)
2013	Interim Processes – PTAB Workload Management (March 26, 2025)
2014	Protective Order, Case No. 2:24-cv-00332 (Aug. 9, 2024)
2015	Maintenance Fee printout from USPTO re: '884 Patent

Patent Owner's Preliminary Response
IPR2025-00429 (U.S. Patent No. 9,450,884)

2016	Assignment Recorded at Reel/Frame: 052372/0675 re: '884 Patent
2017	Testimony of Ozer Teitelbaum, <i>WSOU v. Cisco</i> , 21-cv-00128 (WDTX) (Feb. 10, 2025)
2018	Stipulation in IPR-2025-00188 ('691 Patent)
2019	Discretionary Reply in IPR-2025-00188 ('691 Patent)
2020	FAQs for Interim Processes for PTAB Workload Management
2021	Chrissan Declaration
2022	Excerpt of Computer Networks: A Systems Approach (Fifth Edition)
2023	Cisco Network Convergence System 2000 Series Passive Patch Modules Data Sheet

I. INTRODUCTION

Patent Owner WSOU Investments LLC d/b/a Brazos Licensing and Development (“Brazos” or “Patent Owner”) respectfully requests that the Board deny institution of this Petition for *inter partes* review because the Petition fails to identify where the asserted references teach a “network switching element including a target port” or an “edge switch including a target port” as required by the challenged claims.

The '884 Patent claims specific techniques for mitigating network congestion by dynamically adjusting bandwidth allocation at a target port of a physical network switching element. This innovation addresses a core limitation in prior art solutions, which failed to scale or operate effectively at the level of data center switches. The Petition asserts three obviousness grounds but fails to identify any reference—or combination of references—that teaches or suggests this fundamental claim requirement of a target port belonging to a network switch.

The first Ground fails to demonstrate a reasonable likelihood either of the challenged claims are unpatentable because the references it relies on do not determine bandwidth allocations or adjust those allocations for a target port of a network switch. These references describe a general purpose “application traffic management device” that manages traffic (*i.e.*, determining and adjusting bandwidth allocations) on a particular link in the system (access link 21). The general purpose

“application traffic management device” is not a network switch, and does not perform switching functions. Additionally, because the references describe determining and adjusting bandwidth allocations on the “access link”—and not an internal component of the application traffic management device itself—Ground 1 also fails to show a target port as claimed.

For Grounds 2 and 3, Petitioner inconsistently shifts its identification of the claimed “target port” from physical ports to internal memory buffers—virtual output queues (VOQs)—in an effort to retroactively align the prior art with the challenged claims. This strategy fails to present a coherent theory of unpatentability. VOQs are not ports, and Petitioner’s analysis never bridges that fundamental gap.

As discussed further below, and in the supporting declaration of Dr. Douglas Chrissan (Ex. 2021), the Petition fails to demonstrate a reasonable likelihood that either claim 1 or 17 is unpatentable. The Board should deny institution.

II. THE CHALLENGED PATENT—U.S. PATENT NO. 9,450,884

A. Overview

The ’884 Patent is titled “Software Defined Networking Based Congestion Control” and describes techniques for “adjusting bandwidth allocation by a network element in a communications network.” Ex.1001 at 1:46-47. The ’884 Patent explains that network congestion occurs at the physical network switches, and more specifically at the output-port of the switches. *Id.* at 11:13-32. However, as described

in the '884 Patent, “most data center switches do not address network congestion, which may result in packet losses and may affect a quality of service (QoS) of some data flows.” *Id.* at 1:24-26. The inventors realized that packet loss in data centers is due to data bursts rather than high-link utilization and therefore simply adding more switch capacity would not effectively address network congestion. *Id.* at 1:26-33.

The '884 Patent explains that prior art methods for addressing network congestion relating to throttling data transmissions at servers is ineffective because these solutions are limited in the number of concurrent connections/flows in use. The '884 describes these shortcomings as follows:

Some switch-side solutions utilize Explicit Congestion Notification (ECN) functionality, but such solutions may not be scalable in terms of the number of concurrent dataflows. For example, Data Center TCP (DCTCP), which controls a server's sending rate by exploiting the ECN, can endure up to thirty five (35) connections without suffering any packet loss. However, most data centers may have a number of concurrent flows that frequency exceed thirty five (35) flows per server.

Ex. 1001 at 1:33-41.

Instead, the '884 Patent teaches using a “network element,”—*i.e.*, a switch—to adjust the bandwidth allocated to its various ports. Ex. 1001 at 1:48-51. “[T]he network element includes a plurality of ports, the plurality of ports including a target

port and each of the plurality of ports is assigned a corresponding bandwidth allocation.” *Id.* at 1:61-64. The network element monitors the dataflow traversing one of its ports, which the ’884 Patent calls the “target port.” *Id.* at 50-52. The network element determines the bandwidth currently allocated to the target port and then calculates the fair-share bandwidth of the target port based on the total bandwidth of the network element (or switch) itself. *Id.* at 1:52-60. Having calculated the fair-share bandwidth, the network element (or switch) adjusts the bandwidth allocation of the target port based on the fair-share bandwidth allocation. *Id.* The goal of this bandwidth allocation adjustment is to alleviate network congestion. Ex. 1001 at 11:13-32.

B. Claims of the ’884 Patent

Petitioner challenges independent Claims 1 and 17 of the ’884 Patent. Method claim 1 is recited below:

- 1[pre].** A method of adjusting bandwidth allocation by a network switching element in a communications network, the network switching element including a target port, the method comprising:
- [1.1]** determining, by the network switching element, a bandwidth allocation for the target port, the bandwidth allocation for the target port being a bandwidth that is currently allocated for the data flow;
 - [1.2]** determining, by the network switching element, a fair-share bandwidth allocation for the target port, the fair-share bandwidth allocation being a proportional allocation of a total bandwidth of the network switching element; and

[1.3] adjusting, by the network switching element, the bandwidth allocation for the target port based on the fair-share bandwidth allocation.

Ex. 1001 at 21:64-22:16. Notably, claim 1 recites the network element or device described in the specification as a “network switching element,” where the “network switching element” itself (1) includes the target port (“network switching element including a target port”), (2) determines the bandwidth allocation and fair-share bandwidth allocation for the target port (“determining, by the network switching element, a bandwidth allocation for the target port . . . determining, by the network switching element, a fair-share bandwidth allocation”), and (3) adjusts the bandwidth allocation (“adjusting, by the network switching element, the bandwidth allocation for the target port”). *Id.*

Independent claim 17 contains similar determining and adjusting steps to claim 1 but differs in that it is an apparatus claim reciting an “edge switch.” *See* Ex. 1001 at 24:52-64. Like claim 1, the “edge switch” recited in claim 17 itself performs the monitoring, determining and adjusting steps relating to its target port. *Id.*

C. Relevant Prosecution History of the '884 Patent

The application that led to the '884 Patent was filed on June 11, 2014. Ex. 1002 at 82. On January 12, 2016, the examiner issues a rejection of claims 1 and 17 as being anticipated by U.S. Patent No. 8,949,444 (“Ma”). *Id.* at 57. Unlike issued claims 1 and 17 that are directed to “networking *switching* element,” the originally

filed claims subject to this rejection over Ma recited the considerably broader “network element.” *Id.* at 43, 48.

In response to the January 12, 2016 rejection, applicants amended the claims to specifically claim “network switch” and “edge switch” element. Applicants made clear in their arguments supporting the amendment adding “switch” language that the “switch” language expressly distinguished the claims from the prior art:

Ma does not teach “monitoring, by the network switching element, a data flow traversing the target port of the switching element” (as recited in claim 1. That is to say, Ma does not monitor data traveling through a “target port” of the proxy device 120, itself. Instead, Ma only monitors data flows from ports that are at the user device 110 or the resource 130, where the user device 110 and resource 130 are not a “network switching element” (as recited in claim 1).

Ex. 1002 at 48 (emphasis in original). Additionally, applicants argued that performing various functions at a “target port” further distinguished the claims from prior art including Ma. Importantly, both Challenged Claims require the “target port” to be part of the switch: “the network switching element including a target port” (claim 1, *id.* at 38) and “the edge switch including a target port” (claim 17, *id.* at 44-45). Applicants argued that because the system disclosed in Ma was not performing the claimed functions at the “target port” of the device that the examiner identified

as the “network element” of the original claims—*i.e.*, Ma’s proxy device 120—it did not meet the claim language requiring the target port:

Furthermore, Ma does not teach regulating a bandwidth for a port at the proxy device 120. Rather, as described in col. 9, l. 3-24 (relied upon by the Examiner), Ma teaches regulating data flow for bandwidth allocation of ports at the user device 110 and resource 130 (*i.e.*, at a source and destination of the data flow). For this reason, Ma does not teach “determining, by the network switching element, a bandwidth allocation for the **target port**, the bandwidth allocation for the target port being a bandwidth that is current allocation for the data flow,” “determining, by the network switching element, a fair-share bandwidth allocation for the **target port**, the fair-share bandwidth allocation being a proportional allocation of a total bandwidth of the network element” and “adjusting, by the network switching element, the bandwidth allocation for the **target port** based on the fair-share bandwidth allocation” (as recited in claim 1). For these reasons, Ma does not teach all of the limitations of claim 1.

Ex. 1002 at 12-13 (emphasis original).

In response to this amendment, the examiner issued a notice of allowance on May 20, 2016. In his “statement of reasons for the indication of allowable subject matter,” the examiner specifically cited the language requiring the “switching element” and the “target port”:

Claim 1 is allowed because the closest prior art, Ma et al (U.S. Patent No. 8949444), and Excell (U.S. Patent Publication No. 2012/0195192), either singularly or in combination, fail to anticipate or render obvious a method comprising: “monitoring, by the network switching element, a data flow traversing the target port of the network switching element,” and “determining, by the network switching element, a fair-share bandwidth allocation for the target port, the fair-share bandwidth allocation being a proportional allocation of the total bandwidth of the network switching element,” in combination with all other limitations in the claim as claimed and defined by the applicants.

Ex. 1002 at 22.

III. PERSON OF ORDINARY SKILL IN THE ART (POSA)

Petitioner identifies a person of ordinary skill in the art (“POSA”) as of July 11, 2014 as a person who “would have had a working knowledge of the computer networking art that is pertinent to the ’884 Patent, including techniques for managing and allocating bandwidth within network devices. A [POSA] would have had a master’s degree in computer science, computer engineering, electrical engineering, or an equivalent, and two years of professional experience relating to packet-based computer networking. Lack of professional experience can be remedied by additional education, and vice versa.” Pet. at 11-12. For the purposes of determining

whether institution is appropriate, Patent Owner concurs that this definition for POSA is adequate.

IV. CLAIM CONSTRUCTION

According to 37 C.F.R. § 42.104(b)(3), Petitioner has an affirmative burden to set forth how the challenged claims should be construed. *See, e.g., Orthopediatrics Corp. v. K2M, Inc.*, IPR2018-01548, Paper 9 at 10 (PTAB Mar. 1, 2019). In construing challenged claims, the Board follows the standard set by *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). *See also* 37 C.F.R. § 42.100(b). Petitioner must therefore advance a rationale for its proposed claim constructions under *Phillips* to satisfy the requirements of 37 C.F.R. § 42.104(b)(3). Here, Petitioner does not advance any claim constructions. Pet. at 12-13. As such, the '884 Patent claims should be construed in accordance with the ordinary and customary meaning of such claims 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).

V. RESPONSE TO ASSERTION OF MATERIAL FACTS IN PETITION

- 1.) Denied.
- 2.) Admitted.
- 3.) Admitted.
- 4.) Admitted.
- 5.) Denied.

- 6.) Denied.
- 7.) Denied.
- 8.) Denied.
- 9.) Admitted.
- 10.) Admitted.
- 11.) Denied.
- 12.) Denied.
- 13.) Denied.
- 14.) Denied.

VI. NONE OF THE ASSERTED PRIOR ART TEACHES THE CLAIMED SWITCH ELEMENT OR TARGET PORTS

The Petition asserts three grounds of alleged unpatentability of the '884 Patent, none asserting anticipation: (1) obviousness in light of Feroz in combination with Riddle; (2) obviousness in light of Petersen; and (3) obviousness in light of Petersen in combination with Palacharla. Pet. at 12. None of these references contain the core teaching of the '884 Patent, namely that network traffic is monitored and adjusted at a “target port” of a “network switching element” (claim 1) or “edge switch” (claim 17) as expressly required by both the challenged claims. Ex. 1001 at 21:64-22:16, 24:52-64. Instead, the asserted references generally describe network traffic management, but with implementations in other components such as

“application traffic management devices” that are unrelated to, and materially different from a switch. *E.g.*, Ex. 1005 at 5:64-67. Given that none of the references alone or in combination teach monitoring and adjusting network traffic at “the target port of a network switching element” or “edge switch” as claimed, the Petition fails to demonstrate a reasonable likelihood of unpatentability.

A. Legal Standard for Obviousness

A claim is unpatentable for obviousness under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). “Although ‘a patent can be obvious in light of a single prior art reference,’ the Federal Circuit has held that a single-reference obviousness ground requires that ‘it would have been obvious to modify that reference to arrive at the patented invention.’” *ADT LLC v. Vivint, Inc.*, IPR2022-00634, Paper 7 at 15 (PTAB Oct. 4, 2022) (quoting *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016)). “[S]ingle reference obviousness requires a showing of motivation to modify a reference when a party argues that such a modification must be made to meet the limitations of a claim.” *SK Hynix Inc. v. Netlist, Inc.*, IPR2017-00561, Paper 36 at

11 (PTAB July 5, 2018) (citing *Monsanto Tech. LLC v. E.I. DuPont de Nemours & Co.*, 878 F.3d 1336, 1346 (Fed. Cir. 2018)).

Where, however, allegations of obviousness are premised upon multiple references, petitioners are required to demonstrate a reason to combine references. When multiple prior art references are combined, a claimed invention is not obvious unless a person having ordinary skill in the art would have been motivated to combine the references. *KSR*, 550 U.S. at 418. Claiming that two references are similar or relate to the same industry or technology is not enough. *Heart Failure Techs., LLC v. Cardiokinetix, Inc.*, IPR2013-00183, Paper 12 at 9 (PTAB July 31, 2013); *see also William Wesley Carnes, Sr., Inc. v. Seaboard Int'l Inc.*, IPR2019-00133, Paper 10 at 18-19 (PTAB May 8, 2019) (“[A] statement of similarity, however, does not constitute an articulated reasoning with rational underpinning as to why a POSITA would combine elements of one reference with another, and why a POSITA would modify the teachings of the references to arrive at the claimed invention.”); *Sipnet EU S.R.O. v. Straight Path IP Group, Inc.*, IPR2013-00246, Paper No. 11 at 20 (PTAB Oct. 11, 2013). For instance, in *Heart Failure Technologies*, the PTAB held that it was not obvious to combine several references merely because they all related to heart repair devices:

The fact that [the references] all concern human heart repair is not in itself sufficient rationale for making the combination. Many heart repair

devices exist. That fact alone would not make it obvious to combine their features. Petitioner must show some reason why a person of ordinary skill in the art would have thought to combine particular available elements of knowledge, as evidenced by the prior art, to reach the claimed invention.

IPR2013-00183, Paper 12 at 9. The law requires that Petitioner show some reason why a POSA would have thought to combine the multiple references that Petitioner identifies in each of its Grounds 1 and 3, beyond the mere allegation that the references in question both generically relate to networks.

B. Ground 1: The Asserted Prior Art Does Not Disclose a Network Switching Element or Edge Switch As Required by the Challenged Claims.

Ground 1 from the Petition asserts that claims 1 and 17 are obvious in light of Feroz (Ex. 1003) in combination with Riddle (Ex. 1006). Pet. at 12. Petitioner presents the combination with Riddle as to limitations 1.3 and 1.4 to argue that both inbound and outbound data flows may be controlled with Feroz's application traffic management device. *E.g.*, Pet. at 42 ("In summary, the combination of Feroz and Riddle contemplate monitoring and controlling bandwidth usage for all inbound and outbound data flows."). The Petition argues that all other aspects of claims 1 and 17 are taught by Feroz, including "the network switching element including a target port" (claim 1) and "the edge switch including a target port" (claim 17). But as discussed below, Feroz does not disclose or teach either of these limitations, and

therefore Ground 1 fails to demonstrate claim 1 or 17 is unpatentable. *See* Ex. 2021 (Chrissan Declaration) at ¶¶ 20-28.

As discussed briefly above, the '884 Patent addresses data traffic congestion in data center switches: “[H]ardware manufacturers are also developing cost-effective and high-performance data center switches . . . However, data center switches do not address network congestion, which may result in packet losses and may affect a quality of service (QoS) of some data flows.” Ex. 1001 at 1:11-28. Specifically, the '884 Patent explains that network congestion occurs at the output port of the physical network switches. *Id.* at 11:13-32 (“The output port [of a physical network switch] is where the network congestion in data centers mainly occurs.”). “Therefore, example embodiments provide for congestion management and/or congestion avoidance schemes for [switches].” *Id.* at 11:20-25.

During prosecution of the '884 Patent, the applicants amended the claims to expressly recite performing these traffic management functions on the output (e.g., target) ports of network switches to distinguish prior art. Original claims 1 and 17 recited a “network element,” yet both claims were amended to “network **switching** element” to distinguish the Ma patent. Ex. 1002 at 38, 44-45. In contrast, Ma does not mention or suggest switching devices, and as a result, the examiner allowed the amended claims reciting switches and issued the '884 Patent. *Id.* at 22. Notably, like

Ma before, Feroz does not mention or suggest the use of network switching elements or edge switches, either. *See* Ex. 2021 at ¶¶ 20-28.

At this stage, the Board need not determine whether the preambles are limiting because the “network switching element” and “edge switch” terms in the preamble are used throughout the claims. For example, the preamble for claim 1 includes “a network switching element . . . including a target port” and claim 17 includes “an edge switching element . . . including a target port.” The Petition treats claim 1 and 17 as reciting substantially the same limitations, and as such, both claims will be discussed together for purposes of this POPR. Pet. at 58-60. Thus, the below analysis showing Feroz fails to teach these features of the preambles apply equally to all the other claim limitations that repeat these terms.

The Petition acknowledges that neither of its references for Ground 1 include a “network switching element” or “edge switch” as required by the challenged claims. *See, e.g.*, Pet. at 24. Rather, the Petition offers two obviousness arguments attempting to equate Feroz’s “application traffic management device” to the claimed network switching element and edge switch. Pet. at 23-26. First, the Petition argues that because the application traffic management device “processes . . . MAC addresses [and] IP addresses,” “it would have been obvious to a POSITA for the application traffic management device 130 to be a ‘*network switching element*,’” even though it does not perform any other network switch functions. *Id.* (emphasis

in original). The Petition provides no further argument beyond this mention of MAC address processing—yet cites to one of multiple paragraphs in the '884 Patent describing switches. Pet. at 24 (citing Ex. 1001 at 8:11-25). The Petition fails to address any of the other hallmark characteristics of switches such as routing data to specific ports of the switch itself, neither those contained within the paragraph it cites, nor the surrounding four paragraphs describing switches. *See* Ex. 1001 at 7:63-8:57 (“The switches may be configured to process and route data (or data packets) at the data link layer (layer 2) of the OSI model, and/or process data (or data packets) at the network layer (layer 3) (i.e., the switches may be considered ‘multilayer switches’). The switches may employ multiple connection interfaces in order to allow different user agents and/or user devices to connect to a communications network, including Ethernet, Fibre Channel, ATM, ITU-T, G.hn, 802.11, and/or other like connection interfaces”). Any number of devices process MAC and IP addresses (such as any computer), and this function in no way teaches or suggests a network switch or distinguishes one from any other network device.

Second, the Petition argues that another unrelated patent application having Feroz as one of the authors describes that an “application traffic management device” “may be contained in router 22” and as such “the combination of application traffic management device 130 and router 22 also render obvious the ‘*network switching element*.’” Pet. at 24 (emphasis in original). In addition to failing to

provide a reason to combine this unasserted patent application with Feroz, the Petition contains no further explanation of how the combination of the “application traffic management device” and the “router” render obvious a network switch. *See generally* Pet. at 24-26 (failing to explain why it would have been obvious to a POSA to combine an application traffic management device with a router). Like the “application traffic management device,” a “router” is not a “network switching element.” and as such, Ground 1 fails.

The Petition is unclear on whether it intends to assert a third argument related to whether Feroz's application traffic management device is a network switching element, because this third argument is prefaced with the statement that it is “[c]onsistent with application management device 130 being a ‘network switching element’” Pet. at 24-25. However, the middle of this paragraph argues, “[e]specially in embodiments where the application traffic management device 130 has three or more Ethernet interfaces, it would have been obvious to a POSITA for application traffic management device 130 to be a ‘network switching element’” Pet. at 25. The Petition bases this on a single sentence in Feroz that says the application traffic management device “can include additional network interfaces beyond network interfaces 71 and 72 to support additional links or other functionality.” Pet. at 25 (citing Ex. 1005 at 6:42-46). According to the Petition, the mere addition of a third network interface automatically transforms Feroz's

application traffic management device into a network switching element, even though no such switching functionality is disclosed in Feroz. *Id.*

The Petition's analysis here fails for two reasons. First, the cited sentence is at best ambiguous as to what it is referring to by "additional network interfaces." *See* Ex. 1005 at 6:42-46. For example, that may mean network interfaces other than Ethernet. *See, e.g.,* Ex. 1001 at 10:21-40 (identifying many other network interface technologies). Where the sentence refers to different network interface technologies, it does not necessarily mean there would ever be more than two as the Petition argues. Pet. at 25. Secondly, "having more than two network interfaces" does not inherently describe a network switching element. Rather, other computing devices have multiple network interfaces yet do not perform any switching, such as an Ethernet hub or Cisco's Passive Patch Panel Modules. Ex. 2023. The Petition's reasoning that a POSA would understand Feroz's application traffic management device could be modified to incorporate a "network switching element" is thus flawed and conclusory, and does not render the '884 Patent's claimed "network switching element" or "edge switch" obvious.

Additionally, the Petition does not provide sufficient analysis to show why a POSA would modify Feroz by substituting the claimed "network switching element" for Feroz's application traffic management device. Here, where obviousness is based on a single reference, the Petition must "show a skilled artisan would have been

motivated to, and reasonably expected to be able to” make the required modification to the single reference. *Chemours Co. FC, LLC v. Daikin Indus.*, 4 F.4th 1370, 1377 (Fed. Cir. 2021); *Arendi S.A.R.L.*, 832 F.3d at 1361 (“a patent can be obvious in light of a single prior art reference if it would have been obvious to modify that reference to arrive at the patented invention”). The Petition does not identify any motivation to modify Feroz’s application traffic management device to include a switch, beyond attempting to match the language of the challenged claims. *See generally* Pet. at 24-26. For example, the Petition does not argue that such modification of Feroz would result in a more efficient, better performing, or cheaper system. Rather, the Petition merely recites a hindsight-based analysis designed to meet the desired claim limitations, and the Board should reject it.

C. Ground 1: The Asserted Prior Art Does Not Teach Monitoring, Determining or Adjusting the Allocated Bandwidth for the Claimed Target Port.

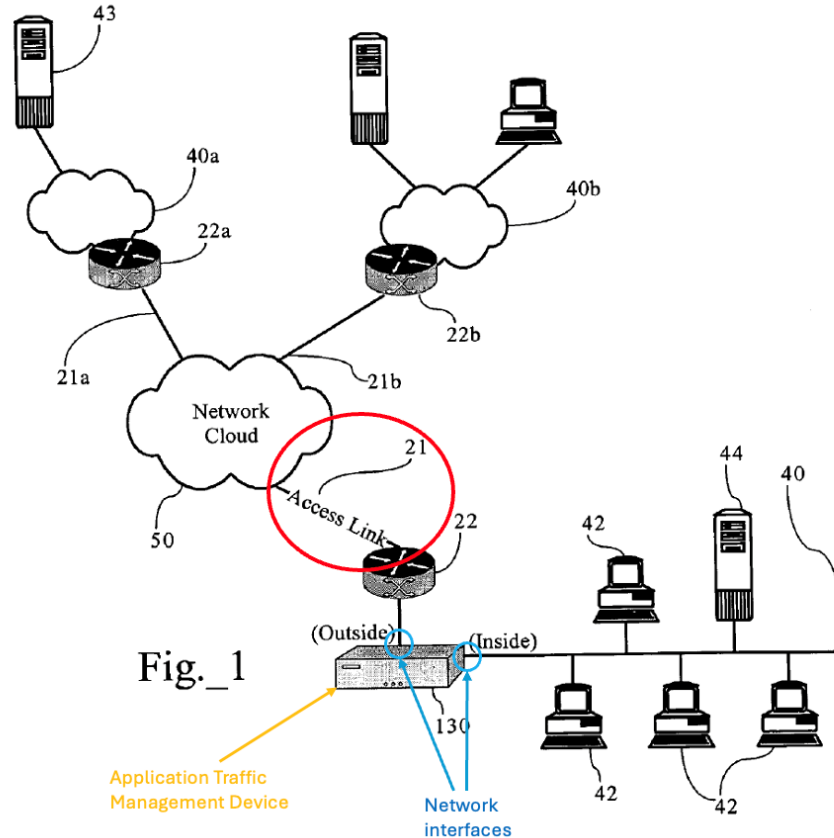
As discussed above, both claim 1 and 17 require a “target port” that is included in the switch itself: “network switching element including a target port” (claim 1) and “edge switch including a target port” (claim 17). The claims also require that the switch monitor its target port, determine bandwidth allocations for its target port, and adjust the bandwidth allocation for its target port. *See, e.g.*, Ex. 1001 at 22:1-16, 24:54-64. For its Ground 1 analysis, the Petition first identifies “any network interface of the application traffic management device” as the “target port.” Pet. at

25 (“Any of the application traffic management device’s network interfaces corresponds to the claimed ‘target port’”). But the application traffic management device of Feroz does not determine or adjust bandwidth allocations for the network interfaces as required by claims 1 and 17. Ex. 1001 at 22:4-16, 24:56-64; Ex. 2021 at ¶¶ 29-31. Instead, as explained in detail below, the Petition changes its identification of the “target port” from the network interface of the application traffic management device to “partitions,” yet never explains why a POSA would be motivated to make that switch in the middle of the claim. As explained in more detail below, “partitions” are not a port of the switch as required by the plain language of the challenged claims; additionally, Feroz clearly describes determining and adjusting bandwidth allocations of the system’s access link 21, not the network interfaces. Ex. 1005 at 6:18-20; Ex. 2021 at ¶¶ 29-31. As such, the Board should deny institution based on Petitioner’s inconsistent analysis.

For example, for the claim limitation “adjusting, by the network switching element, the bandwidth allocation for the target port,” the Petition cites to sections of Feroz that discuss adjusting various partitions. Pet. at 54-57. On page 55, the Petition presents a number of steps in Ground 1 for calculating bandwidths, and then provides a citation to an explanation of Feroz Fig. 8 that states “the flow control module 94 sets the bandwidth allocation (BW) for the partition node to the aggregate compensation demand (426) and sets the partition satisfaction ration to one”

Pet. at 55 (citing Ex. 1005 at 22:53-65). But Feroz Fig. 8 notably illustrates “computing the aggregate bandwidth allocations among *partitions*.” Ex. 1005 at 5:28-31 (emphasis added). The subsequent paragraph in the Petition argues that Fig. 4B of Feroz shows “allocating those changes down to individual dataflows,” but Fig. 4B demonstrates allocating bandwidth to more *partitions*, not a target port. Ex. 1005 at 5:10-12 (“FIG. 4B is a flow chart diagram setting forth a process directed to recomputing a per-flow queue bandwidth allocation within a partition.”). Nothing in this section of the Petition discussing the adjusting step identified the adjusting of a “target port” but rather, discusses reallocation of bandwidth among “partitions.”

“Partitions” are not “target ports” and would not be understood to be such by a POSA. Ex. 2021 at ¶¶ 29-31. As explained by Feroz, “[a] partition is essentially a bandwidth allocation and queuing mechanism.” Ex. 1005 at 3:61-66. In contrast, the ‘884 Patent, describes the target port as a part of a physical network switch in and out of which data flows, and multiple data flows transit each port. Ex. 1001 at 11:13-20. Furthermore, Feroz explains that partitions are specific to a particular part of Feroz’s system, access link 21: “As discussed above, a partition is essentially a division of the capacity of access link 21.” Ex. 1005 at 13:56-57. In Fig. 1 of Feroz has been modified below to call out the access link 21 (circled in red) and the network interfaces (blue) of the application traffic management device (yellow) previously identified as ports in the Petition:



Ex. 1005 at Figure 1 (annotated).

As can be seen in the above annotated Fig. 1, Feroz's access link 21 *is not part of the application traffic management device* at all. Both claims 1 and 17 require that the target port be “included” in the network switching element or edge switch. Ex. 1001 at 21:66, 24:53-54. Feroz describes the application traffic management device as managing traffic through the access link 21, not the network interfaces as the Petition argues: “application traffic management device 130 is configured to *manage network traffic traversing access link 21.*” Ex. 1005 at 6:18-20 (emphasis added); *see also* 5:64-67 (“application traffic management

device 130 is operative to classify and manage data flows traversing access link 21.”); 5:53-55 (“Access link 21 is a physical and/or logical connection between two networks, such as computer network 50 and network 40.”). As such, by Feroz’s express disclosure, the application management device that manages traffic traversing the access link 21 does not teach or suggest “adjusting, by a network switching element, the bandwidth allocation for the target port” as claimed.

Most importantly, neither of the Petition’s identified candidates for the target port—*i.e.*, the bandwidth partition, or the access link 21—satisfy the claim requirements that the network switching element adjust the bandwidth allocation on a target port that is included in the network switching element itself. Additionally, the Petition does not explain why a POSA would be motivated to ignore the plain teaching of Feroz that the application traffic management device manages traffic on the access link 21 and instead determine that a bandwidth partition and queuing management element meets the target port claim language. As such, the Petition fails to show that Feroz and Riddle render claims 1 and 17 unpatentable.

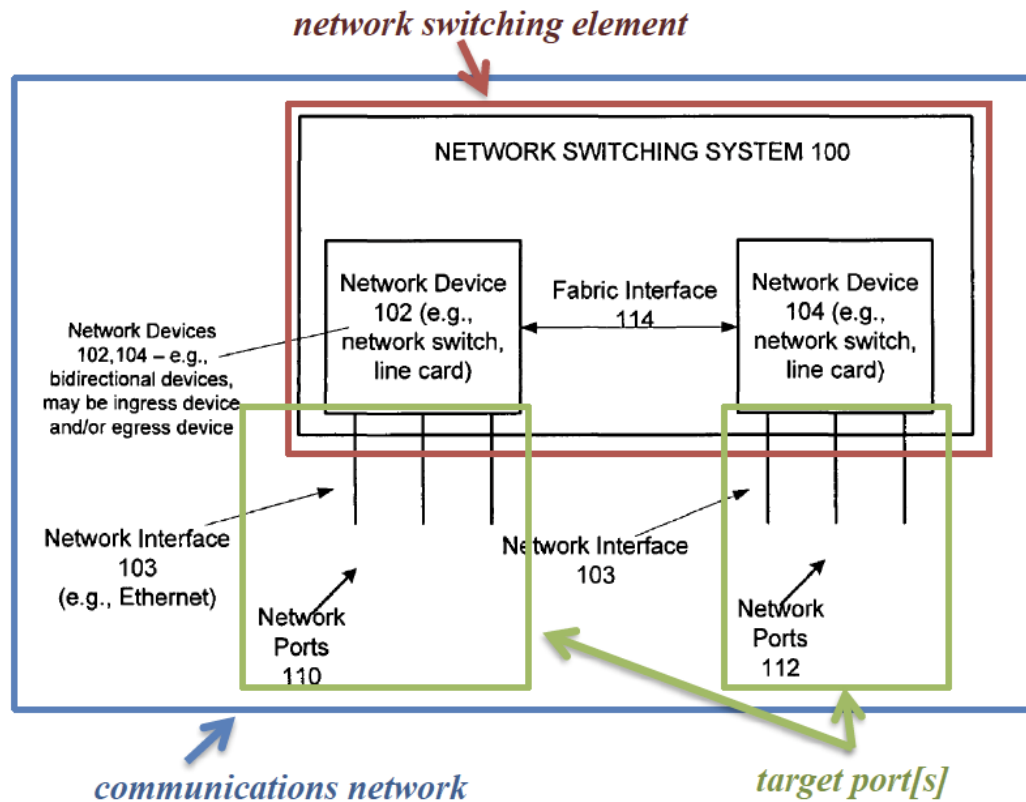
D. Grounds 2 and 3: The Asserted References Fail to Identify The Claimed Target Port of a Network Switching Element or Edge Switch.

The Petition conflates its analysis for Grounds 2 and 3 into the same section. The Petition explains that Ground 3 combines the Palacharla reference with Ground 2’s Petersen reference because Palacharla describes the use of “flexible virtual

queues.” Pet. at 61. Neither Petersen nor the combination of Petersen and Palacharla teaches monitoring, determining or adjusting bandwidth allocations for the recited “target port,” and therefore will be discussed together.

As explained above, the challenged claims require a “network switching element including a target port” or “edge switch including a target port.” Ex. 1001 at 21:64-22:18, 24:52-64. For the “target port” the Petition initially identifies Network Ports 110 and 112 of Fig. 1 of Petersen in connection with the preamble of claim 1. Pet. at 64. Below is an illustration from the Petition’s analysis of Ground 2:

¶165. Any of the ports on Petersen's network switching system, such as an egress port, corresponds to the claimed "*target port*." Ex.1003, ¶166.



Ex.1003, ¶164; Ex.1008, Fig. 1 (annotated).

Pet. at 64. However, nothing in the Petition suggests that Network Ports 110 and 112 are monitored or used to determine a bandwidth allocation or fair share bandwidth allocation, or that the bandwidth allocation of Network Ports 110 or 112 is adjusted, as required by the express language of the challenged claims. Instead, when those claim limitations are discussed, the Petition shifts to identifying various "virtual output queues" or "VOQs." Pet. at 66, 70, 72, 76. Specifically:

- for the first claim limitation, “monitoring by the network switching element, a data flow traversing the target port,” the Petition states “the ingress port¹ ***monitors the queue*** and reports its status.” Pet. at 67 (emphasis added).
- for the second limitation, “determining, by the network switching element, a bandwidth allocation for the target port,” the Petition identifies “***allocating*** more capacity (bandwidth), even all possible bandwidth, ***to a single high-priority queue (VOQ)***” Pet. at 69-70 (emphasis added).
- For the third limitation, “determining, by the network switching element, a fair-share bandwidth allocation for the target port,” the Petition states, “Petersen describes ***allocation a fair-share bandwidth among multiple queues***” Pet. at 73 (emphasis added).
- For the fourth limitation, “adjusting, by the network switching element, the bandwidth allocation for the target port,” the Petition identified the following Petersen quote: “the ingress devices may ***adjust the transmission rate for each VOQ*** to a fair portion” Pet. at 75-76 (emphasis added).

The Petition provides no explanation for why it initially identifies the “target port” as Network Ports 110 and 120, but later drops those in favor of VOQs. As such, this inconsistent analysis comparing Petersen and Palacharla against claims 1 and 17 does not demonstrate unpatentability of the challenged claims, and the Board should therefore deny institution.

Moreover, virtual queues are not “target ports” of a network switching element. Ex. 2021 at ¶¶ 33-34. The Petition implicitly admits this by switching its

¹ The cite from Petersen refers to this as a “ingress device” not an “ingress port”.

identification for “target port” for the claim limitations that perform functions on the target port. *Compare* Pet. at 63-64 (identifying “one or more network ports”) *with id.* at 65-67 (identifying “virtual output queues (VOQs)”). Moreover, virtual queues are not “target ports” for similar reasons that the “partitions” in the Petition’s analysis of Ground 1 are not the “target port.” Rather a virtual queue is a memory buffer in a computing device. Ex. 2021 at ¶¶ 33-34. The target port of a network switching element or edge switch as reciting in the claims is a physical output port. *See* Ex. 1001 at 11:13-32 (“physical network switches consist of multiple input and output ports”). The Petersen reference itself describes ports, including Network Ports 110 and 112, as used for receiving packets from other network elements or transmitting packets to external devices. Ex. 1008 at ¶ 27. In contrast, the Petersen reference describes VOQs as something inside a computing device where multiple VOQs may be *associated with* an ingress or egress device—but *are not the port itself*. *E.g.*, Ex. 1008 at ¶¶ 6, 92. Because the Petition identified VOQs for the determining and adjusting bandwidth allocation limitations of claims 1 and 17, the Petition fails to identify a target port including in a network switching element or edge switch as required for those limitations. Therefore, Grounds 2 and 3 fail to render claims 1 and 17 unpatentable.

VII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests the Board deny the Petition for *inter partes* review.

Respectfully Submitted,

Dated: April 30, 2025

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(Case No. IPR2025-00429)

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CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for all portions of the foregoing Patent Owner's Preliminary Response totals 5,910 words per Microsoft Word, which complies with the requirement of 14,000 words allowed under 37 C.F.R. § 42.24(d).

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CERTIFICATE OF SERVICE

As authorized by Patent Owner's Mandatory Notice, I hereby certify that on April 30, 2025, a copy of this document has been served in its entirety by electronic mail on Petitioner's lead and backup counsel.

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