

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.
Petitioner,

v.

UMBRA TECHNOLOGIES LTD
Patent Owner.

Inter Partes Review No. IPR2024-00497
U.S. Patent No. 10,630,505

**PETITIONER’S AUTHORIZED RESPONSE TO DIRECTOR REVIEW
REQUEST**

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Pursuant to the Authorization dated September 30, 2025, Petitioner hereby provides a response addressing the issues raised by Patent Owner (“PO”) in the Patent Owner’s Request for Director Review (“Request”).

I. INTRODUCTION

Claim 1 recites:

[1.0] A network system comprising:

[1.1] a first device;

[1.2] a second device; and

[1.3] a plurality of intermediate access point servers that form a plurality of end-to-end tunnels connecting the first device and the second device; and

[1.4] a control server, wherein the control server receives information from at least one of the plurality of intermediate access point servers, and wherein the control server selects one of the plurality of end-to-end tunnels for communication between the first and second devices based on the information.

Ex. 1001, 58:12–24.

In the Final Written Decision, the Board considered and rejected PO’s arguments that attempt to import limitations to the claim term “end-to-end tunnel.” FWD 22. The Request asserts that the “Board’s unpatentability decision rests on erroneous findings of material fact and erroneous conclusions of law and is an abuse of discretion and violation of the APA at least because the Board ignored highly relevant intrinsic and extrinsic evidence and arguments that did not support the Board’s construction of the term ‘end-to-end tunnels,’ misunderstood the claims at issue, and engaged in fact-finding unsupported by substantial evidence.”

Request 1. PO's Request rests entirely on the mischaracterization of the record before the Board, Final Written Decision and the final hearing. However, the FWD presents a detailed review of the parties' respective arguments and demonstrates a studied and rational approach undertaken by the Board in arriving at a reasonable and considered construction based on the evidence and canons of claim construction.

II. Background

The Petition asserted that each claim term in the Challenged Claims be given its plain and ordinary meaning and that no specific construction of any claim term is required because the prior art relied on meets each of the claim terms under any reasonable construction. Pet. 15. In the Patent Owner Response (POR), PO agreed with Petitioner, *e.g.*, "Patent Owner does not dispute this proposal." POR 7. Later in the POR, PO asserted that should the Board construe the term "end-to-end tunnel," it should include certain characteristics:

- If any construction need be given to the term "end-to-end tunnel"—which, as noted, neither Party asserts—the intrinsic record reveals that a single "tunnel" is a connection between two devices with encapsulated traffic therebetween (*e.g.*, EPD1 and EPD2) as shown by, for example, the prosecution history of the '505 patent. POR 9.

- A single end-to-end tunnel cannot include multiple tunnels joined together at intermediate points. POR 8, 9, 13, 14, 15, 16.
- An end-to-end tunnel spans in an “uninterrupted fashion” between endpoints. POR 10, 13.

The Petitioner’s Reply addressed each of the POR’s arguments and explained how the POR was mischaracterizing the ’505 Patent and that there was no factual support for any of PO’s three claim construction arguments. Pet. Rep. 13-21.

PO submitted a Patent Owner’s Sur-reply that continued to make the same claim construction arguments:

- end-to-end tunnel requires encapsulation-- Pet. Sur. 8,17
- a single end-to-end tunnel cannot include multiple tunnels –Pet. Sur. 11, 16, 17, 19
- an end-to-end tunnel must be uninterrupted—Pet. Sur 18-19

In the Final Written Decision, the Board addressed each one of asserted arguments from the POR and found that the intrinsic evidence did not support PO’s allegations:

Applying the plain and ordinary meaning in the context of the ’505 patent, as evidenced by the intrinsic evidence summarized above, we conclude that an “end-to-end tunnel” is not required to include an uninterrupted path that provides encapsulated communications between two devices, but instead may include separate segments

between intermediate access point servers or control servers that connect two devices.

FWD 22.

III. The Board Considered and Rejected Each of Patent Owner's Claim Construction Arguments

PO argues that the Board violated its “due process by issuing an unbriefed, new misconstruction” of the term “end-to-end tunnel”, and “it violated the basic tenets of claim construction in two fundamental ways.” PO’s arguments are without factual support.

A. Patent Owner Was Afforded Due Process To Fully Brief Its Claim Construction Position

As discussed above, the POR included three claim construction arguments trying to require an end-to-end tunnel to include certain characteristics. Petitioner addressed each one of the PO’s claim construction arguments in its Petitioner’s Reply. PO reiterated these same three arguments in its Patent Owner Sur-Reply. And the Board addressed and rejected each one of PO’s claim construction arguments in the FWD. For example, for each of PO’s three arguments, the Board identified how the intrinsic evidence did not support the arguments:

Encapsulation:

- Citing Dr. Reddy’s deposition testimony, Patent Owner further argues a “‘tunnel’ contemplated in the ’505 patent is a connection between two devices with encapsulated traffic therebetween, wherein the encapsulated data packet is not unencapsulated until the packet exits the tunnel.” PO Resp. 12–13 (citing

Ex. 2001 (Reddy Deposition), 67:10–22, 69:5–9). Petitioner responds that “[n]one of the figures illustrating end-to-end tunnels discussed above include any discussion of encapsulation.” Pet. Reply 17. We agree that “encapsulation” arguments have little relevance to either construction or patentability of limitation 1.3. Independent claim 1 only requires “communication between the first and second devices.” There is simply no requirement in claim 1, much less in the specification of the ’505 patent, that indicates forming an end-to-end tunnel must include encapsulating traffic between the first and second devices. FWD 28.

Single tunnel:

- The ’505 patent’s Figure 33 (reproduced above at Section I.D.2) also illustrates a “plurality of tunnels” connecting two network devices. FWD 20.
- Applying the plain and ordinary meaning in the context of the ’505 patent, as evidenced by the intrinsic evidence summarized above, we conclude that an “end-to-end tunnel” is not required to include an uninterrupted path that provides encapsulated communications between two devices, but instead may include separate segments between intermediate access point servers or control servers that connect two devices. FWD 22.

Uninterrupted:

- Contrary to Patent Owner’s assertions, we are not persuaded that Figure 33 of the ’505 patent supports a construction requiring the tunnel to be “uninterrupted.” See PO Resp. 9–10. Indeed, Figure 33 illustrates a “third layer of the GVN with respect to neutrality and

security of the GVN tunnel while comparing number of hops of the base Internet connection.” Ex. 1001, 32:42–45 (emphasis added). Figure 33 does not show an “uninterrupted” tunnel because it includes “hops.” FWD 27

- Indeed, Figure 39 shows two separate segments (TUN 39-P10 and TUN 39-P12) connecting each of EPDs 39-100 and 39-102 to SRV_AP 39-200 with internal tunnel 28 IPR2024-00497 Patent 10,630,505 B2 INT TUN 39-20 running through them. PO Resp. 11 (annotated Fig. 39); Ex. 1001, 36:22–47. In our view, this only bolsters our position that an “end-to-end tunnels” may include separate segments and it does not require an “uninterrupted” path between two devices. FWD 28-29.

Thus, the PO was provided with the opportunity to fully brief its claim construction positions, which were fully evaluated and rejected by the Board, and therefore the Request’s assertion that PO was not afforded due process is without factual support.

B. The Board Did Not Find That The Term “Communications Path” Was Synonymous With “End-to-End Tunnel”, or that “End-to-End” was Superfluous

PO’s assertion that the Board found that term “communications path” was synonymous with “end-to-end” tunnel is without factual support. Request 2. The Board specifically asked Petitioner’s counsel if the terms were interchangeable, and Petitioner’s counsel explained that they were only synonymous as long as the

communications path is joined between endpoints and it's formed by intermediate tunnels under the control of the server:

JUDGE ZECHER: Mr. Muldoon, this is Judge Zecher. Do you think that the '505 patent at issue here uses the terms "communication path" and "end-to-end tunnels" interchangeably?

MR. MULDOON: It's not exactly interchangeably, but pretty much interchangeably. Whenever the communication path is joined between endpoints and it's formed by intermediate tunnels under the control of the server, then it is used synonymously, if that answers your question. A communication path by itself is not, but if it's formed by intermediate tunnels and it's -- they're joined at the access point and under the control of the controller, then yes, they are synonymous.

Paper 31 10:25-11:8.

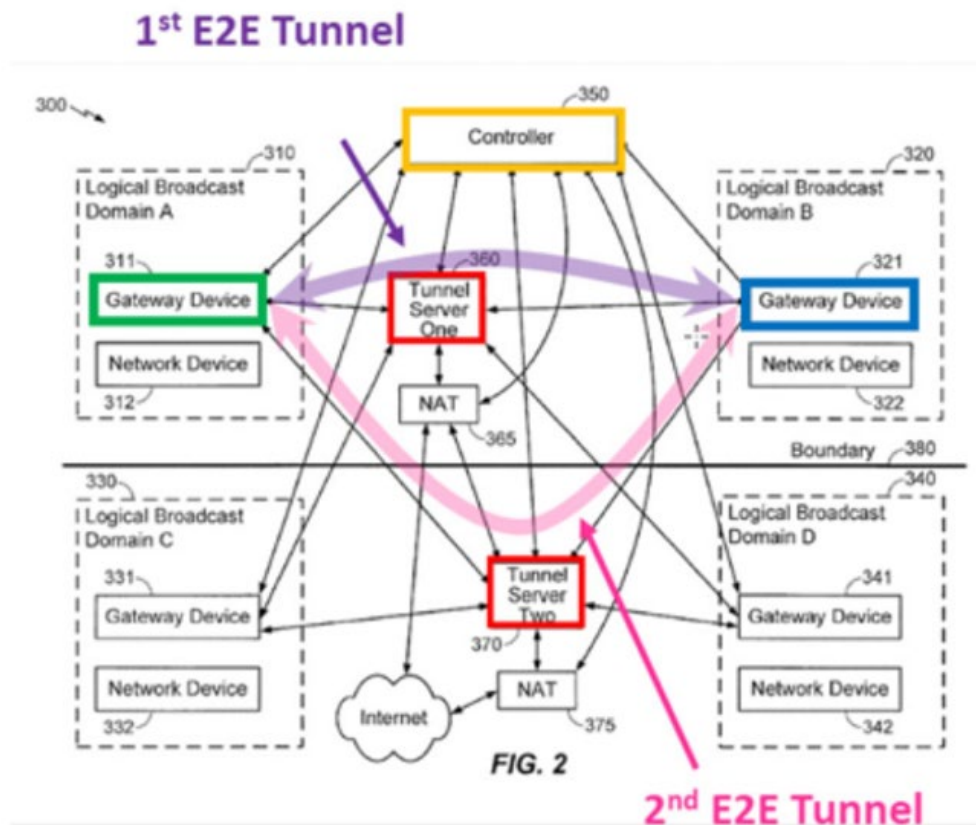
The Board made it clear in the FWD that it understood Petitioner's explanation of the difference between a communication path and end-to-end tunnel when it said:

We take this opportunity to note that our construction after considering the complete record is consistent with our preliminary construction set forth in the Institution Decision because both constructions allow an "end-to-end tunnel" connecting endpoint devices to include intermediate access point servers or control servers therebetween.

FWD 21.

Although, the PO complains that the Board's construction contains “negative” limitations, this was necessarily so to reject PO's attempt to import unnecessary limitations into the claim and thus was result of the PO's own making.

Based on the Board's construction, and the Claim 1 recitation of the first device and the second device, the Board found that the Petition demonstrated that Hankins discloses this end-to-end tunnel limitation as illustrated in FIG. 2 of Hankins showing a gateway (first device) in one domain connected to a gateway (second device) in a different domain through tunnel segments connected at an intermediate tunnel server:



Thus, the Board expressly held that an end-to-end tunnel is not the same as a tunnel segment, but instead may include multiple tunnel segments connected through an intermediate server. FWD 25-30.

IV. The Board Fully Addressed Patent Owner’s “*Third Layer of Logic*” Proposal and Found That It was Unsupported By Expert Testimony

At the final hearing, the PO made clear that its “third layer of logic” proposal was simply its argument discussed in its briefs that an end-to-end tunnel is “uninterrupted:”

JUDGE ANDERSON: So in your preliminary response, you did have a -- what -- we call that an institution decision, a construction, and let me just read it to you. It's, quote, “The term end-to-end tunnel refers to a tunnel that spans in **uninterrupted** fashion the entire overlay network path between endpoints.” And I'm going to focus on that entire overlay network path. Is that what you're talking about that we've been discussing here for a few minutes?

MR. DEVLIN: Yes, exactly. I would say I've fine tuned that now to tie it more closely with what it's called in the specification, **which is a third layer.**

Paper 31 30:6-15 (emphasis added).

During the hearing, PO relied on the testimony of its expert in support of its third layer of logic proposal, but when challenged by the Board, admitted that the expert provided no factual citation in support of his testimony:

JUDGE ZECHER: What I'm hearing you say that is that an end-to-end tunnel can comprise a plurality of intermediate tunnels, but it requires more. What more --

MR. DEVLIN: Exactly.

JUDGE ZECHER: What more does it require? That's what I'm trying to understand.

MR. DEVLIN: Well, that's -- so it requires a separate layer of logic. That's the third layer that's described in the patent and there's other disclosure in the patent about how that is created, but I think one of the basics is inherent in the word tunnel, and that's what we focus on and that's what Mr. Beck is saying -- Dr. Beck is saying, with respect to encoding and de-encoding, that there's going to be an encoding that's going to be carried through from one end of that tunnel to the other at that layer of the tunnel logical structure. So at the third layer, there's going to be some encoding that is not stripped away. And while you can have different networking protocols, moving things across the physical layer or moving things across other logical layers, there's going to be a layer of encoding that is not stripped away at these neutral hops, which are the intermediate access points between the intermediate tunnels in such a --

JUDGE ZECHER: Okay.

MR. DEVLIN: The --

JUDGE ZECHER: I understand what your expert is saying, but this gets back to my initial point. **You didn't cite anything in the specification to support that statement.** Where is this coding that you're talking about in the specification?

MR. DEVLIN: Well, there was the -- again, I think we are relying on the expert for that and relying on his understanding of what tunnel means, so I would agree with that.

JUDGE ZECHER: **But he did not cite the evidence to support that testimony, so what evidence do you have to support it?** That's what I'm asking.

MR. DEVLIN: Well, the next -- I think there's -- let me just say it more clearly. The expert's opinion and declaration is the evidence of which we are relying. **Now, you're asking if he -- does he have underlying evidence from the specification itself. I think he does not cite anything further.** I'd agree with that, but --

JUDGE ZECHER: Can you --

MR. DEVLIN: Yeah.

JUDGE ZECHER: Can you point me to anything further in the specification?

MR. DEVLIN: Well, let me move around here. **So I guess the answer is no, right now I can't.**

Paper 31 28:20-30:10 (emphasis added).

Thus, the Board fully addressed PO's third layer of logic proposal and was entitled to give it little or no weight since it was unsupported. 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.")

V. The Request Mischaracterizes the Prosecution History

The Request asserts that the Board disregarded the importance of the prosecution history. Request 11. The Board did no such thing. The

Request's arguments are based on a mischaracterization of the prosecution history. The Request asserts that the Applicant argued that Chen does not teach "encapsulat[ing] communications between pairs of Smart Device Clients 101,107, or 109 (i.e., the purported endpoint devices)." Request 11. This is not accurate. During prosecution, the examiner rejected Claim 1 as anticipated by Chen. Chen doesn't use the word tunnel. Instead, the examiner asserted that Chen's disclosure of encapsulated communications over a VPN constituted the recited "intermediate tunnel." EX-1002 165. In response, Applicant amended Claim 1 and argued that Chen's encapsulation of communication under the VPN did not correspond to an intermediate tunnel, but even if it did, Chen failed to disclose:

- (1) the use of the VPN protocol to encapsulate communications between pairs of Smart Devices, and
- (2) that the Private Cloud Server joins multiple VPN links to provide end-to-end encapsulation and consequently the VPN links would not form a plurality of "end-to-end" tunnels. EX-1002 0150-151.

Thus, Applicant did not assert that an "end-to-end-tunnel" is an 'encapsulation of communications' between 'endpoints'." Instead, it expressly stated that it disagreed that encapsulation of communications is a tunnel. Its central argument was that Chen did not have a control server that joins tunnels

between endpoints to form a plurality of end-to-end tunnels. EX-1002 151. In other words, Applicant argued that even if Chen’s encapsulation of communications could be deemed to be a tunnel, the tunnels formed were not under the control of a centralized control server. Thus, the prosecution history does not support PO’s argument that an “end-to-end tunnel” requires encapsulation. Encapsulation was only discussed because Chen did not disclose the use of tunnels.

Contrary to the Request’s assertion that the Board “misread this history as contravening the ’505 Patent’s specification” (Request 11), what the Board really said is that **Patent Owner’s arguments that it made at trial regarding the prosecution history** were not persuasive because they contravened the intrinsic evidence. FWD 12.

VI. Extrinsic Evidence Does Not Support PO’s Claim Construction Arguments

The Request asserts that the Board disregarded Petitioner’s expert testimony regarding encapsulation¹ mandates a finding that the Board’s

¹ The testimony of Dr. Reddy relied upon by the PO merely established that generally without reference to the ’505 Patent, “encapsulation **could** occur” at the beginning of a tunnel and “**could** be re-encapsulated” at a second tunnel and “encapsulation can happen at multiple locations” EX-2001 17:18-24 (emphasis

claim construction was not supported by substantial evidence. Request 13-14. The intrinsic evidence demonstrates that the '505 Patent only uses the word encapsulation once when describing that IPv4 traffic can be encapsulated for an IPv6 tunnel. EX-1001 39:27-31. Further, none of the figures of the '505 Patent illustrating end-to-end tunnels include any discussion of encapsulation. That a tunnel can carry encapsulated traffic is no justification for construing an end-to-end tunnel to require encapsulated traffic. The PO's argument regarding encapsulating was simply an improper attempt to import a limitation from an embodiment into a claim term.

Because the intrinsic evidence is clear, it is improper for PO to attempt to use extrinsic evidence, such as expert testimony to change this clear intrinsic evidence. *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1287 2 (Fed. Cir. 2021) (The Court reminded the Board that it “resort[s] to extrinsic evidence to construe claims only if it is consistent with the intrinsic evidence,” and that “[i]f the meaning of a claim term is clear from the intrinsic evidence, there is no reason to resort to extrinsic

added). Dr. Reddy's testimony is not that a tunnel requires encapsulation, and thus is consistent with the Board's construction.

evidence.”) Thus, the Board was not required to consider the testimony of the experts regarding encapsulation.

The Requests asserts an additional argument that at trial, in response to the Board questioning PO’s assertion that encapsulation is required, the PO raised a new argument for the first time that “encapsulation/deencapsulation spanning the entire length of the tunnel is “inherent in the word [‘]tunnel[’].” Request 15 (citing Paper 31 at 29:1-7, 30:12-18.). Whether a “tunnel” inherently requires encapsulation or not, was not an issue that is discussed in either of the parties’ papers. Because this is a new argument raised for the first time at trial, the Board properly did not consider it. *Dell Inc. v. Accelaron, LLC*, 884 F.3d 1364, 1369-70 (Fed. Cir. 2018) (holding that the Board could not, and properly did not, consider an invalidity argument that a party first raised at a final hearing in an *inter partes* review.) Nevertheless, if a tunnel inherently requires encapsulation, then Hankins discloses encapsulation because Hankins discloses the use of tunnels.

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CERTIFICATION OF SERVICE ON PATENT OWNER

Pursuant to 37 C.F.R. §§ 42.6(e), the undersigned certifies that on October 7, 2025, a complete and entire copy of Petitioner's Authorized Response to Director Review Request, was served by electronic mail to the Patent Owner's counsel at the following addresses:

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October 7, 2025

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