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Paper 12
Entered: January 14, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VERIZON BUSINESS NETWORK SERVICES INC.,
Petitioner,

v.

HUAWEI TECHNOLOGIES CO. LTD.,
Patent Owner.

IPR2020-01141
Patent 7,965,709 B2

Before TREVOR M. JEFFERSON, MICHELLE N. WORMMEESTER, and KEVIN C. TROCK, *Administrative Patent Judges*.

WORMMEESTER, *Administrative Patent Judge*.

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

I. INTRODUCTION

Verizon Business Network Services Inc. ("Petitioner") filed a Petition (Paper 3, "Pet.") requesting *inter partes* review of claims 1, 4, 7, and 16 of U.S. Patent No. 7,965,709 B2 (Ex. 1001, "the '709 patent"). Huawei Technologies Co. Ltd. ("Patent Owner") filed a Preliminary Response (Paper 7, "Prelim. Resp."). With our authorization (*see* Paper 9), Petitioner filed a Reply (Paper 10, "Reply") to Patent Owner's Preliminary Response, and Patent Owner filed a Sur-reply (Paper 11, "Sur-reply") to Petitioner's Reply. We have jurisdiction under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." For the reasons that follow, we institute an *inter partes* review as to all the challenged claims of the '709 patent based on all the grounds presented.

II. BACKGROUND

A. Related Proceedings

The parties identify one related federal district court case, *Huawei Technologies Co. v. Verizon Communications, Inc.*, Case No. 6:20-cv-00090 (W.D. Tex.). Pet. 7; Paper 4, 2.

The parties further indicate that Petitioner filed a petition challenging claims 17, 18, 21, and 23 (not challenged in this proceeding) of the '709 patent in IPR2020-01143. Pet. 7; Paper 4, 2. In a separate decision, we deny instituting trial in that case.

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B. The '709 Patent

The '709 patent relates to network switching. Ex. 1001, 1:6. In particular, the '709 patent describes layer 2 bridge forwarding of Ethernet frames across virtual local area networks (VLANs). Ex. 1001, 1:6–15, 2:20–22. To illustrate, Figure 4 of the '709 patent is reproduced below.

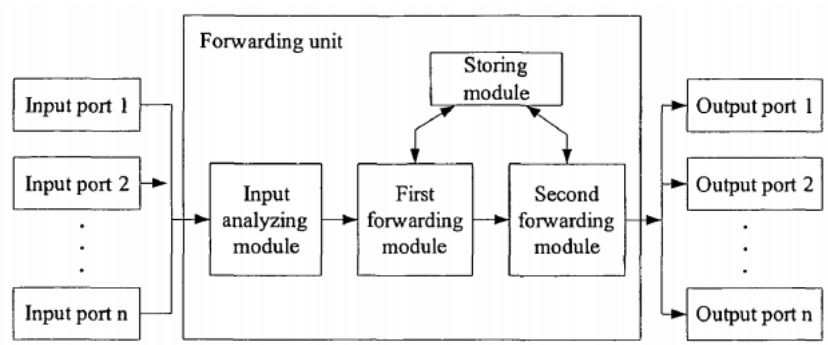


Fig.4

Figure 4 is a diagram of a cross-VLAN bridge forwarding apparatus according to one embodiment of the '709 patent. *Id.* at 3:50–52. The bridge forwarding apparatus includes at least one input port, a forwarding unit, and at least one output port. *Id.* at 8:57–67.

The input port receives a frame from a VLAN. *Id.* at 8:59–60.

The forwarding unit includes an input analyzing module, a first forwarding module, a second forwarding module, and a storage module. *Id.* at 9:1–18. The input analyzing module obtains the input VLAN identifier (VLAN ID) and the destination MAC (DMAC) address of the frame, and outputs the input VLAN ID and the DMAC address to a first forwarding module. *Id.* at 9:7–9, Fig. 4. The first forwarding module determines the virtual switching instance (VSI) that corresponds to the combination of the input port and the input VLAN ID, then searches the MAC address forwarding table corresponding to the VSI (using the DMAC address as a

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keyword) to obtain the output port and the output VLAN ID. *Id.* at 4:37–39, 7:16–18, 9:10–15. To do this, the first forwarding module uses information in the storage module, which stores the relationship between the combinations of the ports and the VLAN IDs with the VSIs, as well as the MAC address forwarding tables corresponding to each VSI. *Id.* at 9:2–6, Fig. 4. The search result of the first forwarding module is output to the second forwarding module, which transmits the frame to the output port according to the search result. *Id.* at 9:16–18, Fig. 4.

The output port transmits the frame to the destination VLAN. *Id.* at 8:66–67.

C. Illustrative Claim

Petitioner challenges claims 1, 4, 7, and 16 of the '709 patent. Claim 1 is independent and illustrative of the claims under challenge:

> 1. A forwarding method, comprising:
>
> receiving, via an input port, a frame associated with a first virtual local area network (VLAN);
>
> obtaining an input VLAN identifier (ID) representing the first VLAN and a destination media access control (MAC) address of the received frame;
>
> determining a Virtual Switching Instance (VSI) corresponding to the combination of the input port and the input VLAN ID;
>
> obtaining an output port and an output VLAN ID, wherein the output VLAN ID represents a second VLAN and wherein the output port and the output VLAN ID relate to the destination MAC address and the VSI; and
>
> communicating the received frame and the output VLAN ID to the obtained output port, wherein the output VLAN ID is different from the input VLAN ID.

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D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1, 4, 7, and 16 of the '709 patent on the following grounds. Pet. 8, 20–58.

Claims Challenged	35 U.S.C. §	References
1, 4, 16	103	Carrie,[1] Hawthorne[2]
7	103	Carrie, Hawthorne, Dobbins[3]

In support of its arguments, Petitioner relies on a Declaration of Dr. Samrat Bhattacharjee, Ph.D. (Ex. 1003).

Patent Owner submits with its Preliminary Response a Declaration of Dr. Nathaniel Davis, Ph.D. (Ex. 2013).

III. DISCUSSION

A. Discretionary Denial Under 35 U.S.C. § 314(a)

The '709 patent is the subject of a pending district court proceeding. Pet. 7; Paper 4, 2. Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution based on the district court proceeding because it involves the same parties, the same claims of the same patent, as well as the same prior art, and it "will outpace a PTAB proceeding on [Petitioner]'s objectively weak Petition." Prelim. Resp. 7; Sur-reply 1–4. To the contrary, Petitioner argues that an evaluation of the *Apple v. Fintiv* factors demonstrates that we should not exercise discretion to deny institution of *inter partes* review. Pet. 17–20; Reply 1–4.

[1] Carrie, U.S. Patent No. 7,693,158 B1, issued Apr. 6, 2010 (Ex. 1005).
[2] Hawthorne, U.S. Publ'n No. 2003/0152075 A1, published Aug. 14, 2003 (Ex. 1006).
[3] Dobbins, U.S. Patent No. 6,711,171 B1, issued Mar. 23, 2004 (Ex. 1007).

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Institution of an *inter partes* review is discretionary. *See* 35 U.S.C. § 314(a) (2018) (stating "[t]he Director *may not* authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition") (emphasis added); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) ("[T]he PTO is permitted, but never compelled, to institute an IPR proceeding."). In determining whether to exercise that discretion on behalf of the Director, we are guided by the Board's precedential decision in *NHK Spring Co. v. Intri-Plex Techs, Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018).

In *NHK*, the Board found that the "advanced state of the district court proceeding" was a "factor that weighs in favor of denying" the petition under § 314(a). *NHK*, Paper 8 at 20. The Board determined that "[i]nstitution of an *inter partes* review under these circumstances would not be consistent with 'an objective of the AIA . . . to provide an effective and efficient alternative to district court litigation.'" *Id.* (citing *Gen. Plastic Indus. Co. v. Canon Kabushuki Kaisha*, IPR2016-01357, Paper 19, 16–17 (PTAB Sept. 6, 2017) (precedential in relevant part)).

The Board's precedential decision in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) ("*Fintiv*") sets forth six factors that we consider when determining whether to use our discretion to deny institution due to the advanced state of parallel litigation:

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;

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> 3. investment in the parallel proceeding by the court and the parties;
>
> 4. overlap between issues raised in the petition and in the parallel proceeding;
>
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
>
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Id. at 6. "These factors relate to whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding." *Id.* In evaluating these factors, we take "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* (citing Patent Trial and Appeal Board Consolidated Trial Practice Guide 58 (November 2019), https://www.uspto.gov/TrialPracticeGuideConsolidated).

For the reasons explained below, we decline to exercise our discretion to deny institution based on § 314(a).

1. Analysis of Factors

We start with an analysis of the six *Fintiv* factors, addressing each factor in turn.

a. Factor 1: Whether the Court Granted a Stay or Evidence Exists that One May Be Granted if a Proceeding Is Instituted

A district court stay of a litigation pending resolution of a PTAB trial allays concerns about inefficiency and duplication of efforts, a fact which weighs strongly against exercising the authority to deny institution. *Fintiv*,

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Paper 11 at 6. Neither party has requested a stay of the district court case pending this proceeding. Thus, the district court has not ruled on this issue.

Petitioner argues that "a stay would be appropriate" should we institute *inter partes* review because "the [district court] litigation is still in its early stages." Pet. 17–18. Patent Owner asserts that the district court "will not grant a stay" because the presiding judge "has never granted a defendant-petitioner's opposed motion to stay litigation pending PTAB proceedings." Prelim. Resp. 7–9. Patent Owner also notes that "the '709 patent is merely one of *seven* patents asserted in the [parallel] [l]itigation," and that "institution of IPR against the '709 patent alone will not control the analysis as to whether a stay is 'appropriate.'" *Id.* at 9.

A judge determines whether to grant a stay based on the facts of each specific case as presented in the briefs by the parties. We decline to infer, based on actions taken in different cases with different facts, how the district court would rule should a stay be requested by the parties in the parallel case here. This factor does not weigh for or against discretionary denial in this case.

b. Factor 2: Proximity of the Court's Trial Date to the Board's Projected Statutory Deadline for a Final Written Decision

If a district court's trial date is earlier than the Board's projected statutory deadline for a final written decision, the Board generally has weighed this fact in favor of exercising discretion to deny institution. *Fintiv*, Paper 11 at 9. During the *Markman* hearing held on September 25, 2020, in the parallel litigation, the district court set the trial date for October 4, 2021.

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Ex. 2009, 158:20–23. Counsel for both parties agreed to that date. *Id.* at 158:24–159:8.

Petitioner expresses its concern about the uncertainty of this trial date, however, due to the COVID-19 pandemic as well as the district court's backlog. Reply 2. Petitioner further notes that "[e]ven if the [parallel] trial commences on October 4, 2021, the [final written decision] in this case would trail by only **3.5 months**," whereas "[i]n *Sand*, the 'relative close proximity' of a trial date scheduled **5 months** before the [final written decision] deadline 'weigh[ed] marginally in favor of ***not*** exercising discretion to deny institution' given the district court's own recognition of a 'continuing degree of . . . uncertainty of the court's schedule.'" *Id.* (quoting *Sand Revolution II, LLC v. Cont'l Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24 at 8–10 (PTAB June 16, 2020) (informative) (emphases added by Petitioner).

Patent Owner counters that "the facts here are fundamentally opposite from *Sand*," as "[t]he gap between the trial date and [final written decision] in *Sand* was the result of 'uncertainty' due to the parties jointly moving 'to ***extend*** schedule deadlines ***twice***.'" Sur-reply 1–2 (quoting *Sand*, Paper 24 at 8–9) (emphases added by Patent Owner). Patent Owner points out that "the trial date [in *Sand*] was ***repeatedly moved backward***, which then favored institution," whereas "the trial date for the [parallel] [l]itigation here was ***moved forward*** by over two months, with [Petitioner] never opposing this earlier trial date." *Id.* at 2 (citing Ex. 2009, 158–159; Ex. 2010, 3; Ex. 2012); *see also* Pet. 18 (stating initially that "[t]he trial in the litigation is scheduled to start on December 6, 2021").

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We agree with Patent Owner. The Board in *Sand* found that the circumstances there, including the district court's extension of the trial date three times as well as its inclusion of the qualifier "or as available" for each calendared trial date, made it "unclear that the court in the related district court litigation will adhere to any currently scheduled jury trial date or, if it is changed, when such a trial will be held." *Sand*, Paper 24 at 8–9. By contrast, the circumstances here do not give rise to such uncertainty regarding the district court's schedule. As Patent Owner notes, the district court's trial date was moved forward to October 4, 2021, with counsel for both parties agreeing to that date. We generally take courts' trial schedules at face value absent sufficient evidence to the contrary. Unlike the panel in *Sand*, we have no reason to believe that the jointly agreed-upon trial date will be postponed. Accordingly, this factor does not weigh against discretionary denial in this case.

c. Factor 3: Investment in the Parallel Proceeding by the Court and the Parties

We consider now the amount and type of work already completed in the parallel litigation by the district court and the parties at the time of the institution decision. *See Fintiv*, Paper 11 at 9.

Patent Owner argues that the district court "has already heard the parties' fully briefed arguments on claim construction and conducted a *Markman* hearing regarding the same." Prelim. Resp. 12. Patent Owner further notes that "[f]act discovery is fully underway, and by the time of institution, the parties will have served their extensive final infringement and invalidity contentions." *Id.* Additionally, Patent Owner contends that "if the

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Board institutes, litigation will occur contemporaneously on *two fronts* at the Western District of Texas and the PTAB, thereby generating duplicative costs *for the next year*, after which the Board's final written decision could only second-guess the jury's earlier findings." *Id.* at 13.

Petitioner replies that "much of the district court's investment relates to ancillary matters untethered to the validity issue itself." Reply 3 (quoting *Sand*, Paper 24 at 11). Petitioner asserts that "[a]lthough *Markman* has occurred (but without an order) and final infringement contentions will be served before institution, fact discovery will still be ongoing, expert invalidity reports will not be due for 3.5 months, and substantive motion practice will not have started."[4] *Id.* Petitioner also asserts that "the district court's claim construction effort 'appears to have little bearing on the issues of patentability' as neither party proposes any claim terms for construction in this proceeding." *Id.* (quoting *Google LLC v. Parus Holdings, Inc.*, IPR2020-00846, Paper 9 at 17 (Oct. 21, 2020)). In addition, Petitioner notes its "promptness in filing [the Petition] only two months after being served infringement contentions." *Id.* at 3–4; *see also* Ex. 2011, 1 (stating that Patent Owner's preliminary infringement contentions were served on April 22, 2020).

For this factor, *Fintiv* provides the following guidance:

> [I]f, at the time of the institution decision, the district court has issued substantive orders related to the patent at issue in the petition, this fact favors denial.[] Likewise, district court claim construction orders may indicate that the court and parties have invested sufficient time in the parallel proceeding to favor denial. If, at the time of the institution decision, the district court has not

[4] It appears from a review of PACER that the district court entered a claim construction order on November 30, 2020.

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> issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution under *NHK*.

Fintiv, Paper 11 at 9–10. Here, we recognize that the parties in the parallel proceeding have completed some work, including submitting fully briefed arguments on claim construction and serving preliminary infringement and invalidity contentions, and that the court has entered a claim construction order. Pet. 18; Ex. 2009; Ex. 2011, 1. Discovery is not over, however, and much remains to be completed in advance of trial. The parties have requested that the close of fact discovery not be scheduled until April 23, 2021, and that the close of expert discovery not be scheduled until June 18, 2021. Ex. 2010, 2. There also is no evidence that the parties have submitted briefing on any dispositive issue, or that the district court has made any determination on the merits. Thus, the evidence shows that the investment in the parallel proceeding related to the validity issue is minimal.

Fintiv further instructs that a petitioner's diligence or delay in filing a petition may be relevant. *Fintiv*, Paper 11 at 11–12. If the evidence shows that a petitioner filed its petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against denying institution. *Id.* at 11. If the evidence shows the petitioner did not file its petition expeditiously, such facts have favored denial. We credit Petitioner's diligence in filing the Petition in this case within a short time (less than three months) after being served infringement contentions in the parallel case.

Based on the minimal investment in the parallel proceeding and Petitioner's diligence in filing the Petition, this factor weighs against discretionary denial.

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d. Factor 4: Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

This factor evaluates "concerns of inefficiency and the possibility of conflicting decisions" when substantially identical prior art is submitted in both the district court and the *inter partes* review proceeding. *Fintiv*, Paper 11 at 12.

Patent Owner argues that "[t]he overlap between validity issues raised in [the] Petition and the [parallel] [l]itigation is extensive." Prelim. Resp. 13. As support, Patent Owner asserts that "the Carrie and Hawthorne references advanced in [this proceeding] are both asserted in [Petitioner's] invalidity contentions." *Id.* (citing Ex. 2011, 15–30). Patent Owner further asserts that, "[c]ollectively, the [c]hallenged [c]laims in this IPR and co-pending IPR2020-01143 (i.e., claims 1, 4, 7, 16–18, 21, and 23) are also a *perfect match* to the asserted claims in the [parallel] [l]itigation." *Id.* (citing Ex. 2011, 17).

Petitioner responds, however, by stipulating that it "will not pursue in the parallel district court proceeding (WDTX-6-20-cv-00090) the prior art obviousness combinations on which trial is instituted for the claims on which trial is instituted." Reply 4. This stipulation is formalized in an e-mail among counsel for the parties. Ex. 1033; *see also* Pet. 19 ("[I]f the Board institutes trial, Petitioner will cease asserting in the district court litigation the prior art obviousness combinations on which trial is instituted for the claims on which trial is instituted, while trial is instituted.").

In its Sur-reply, Patent Owner asserts that "[t]he narrow conditions of [Petitioner's] 'stipulation' are far different from the type of stipulation that would actually eliminate the possibility of conflicting decisions."

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Sur-reply 3. According to Patent Owner, "the Reply never denied [Petitioner] will present to the jury the same . . . proposed modifications to the same Carrie reference based on the same alleged 'motivation' (albeit with a redundant secondary reference other than Hawthorne)," and "[t]he Board will be left to second-guess the jury's conclusions on these same issues about 3.5 months after the jury trial." *Id.* at 3–4. Patent Owner adds that "[Petitioner] asks the Board to speculate that some claims ***from the '709 patent*** will be reduced rather than claims ***from many other patents*** in the [parallel] [l]itigation." *Id.* at 4.

As Petitioner acknowledges, "[t]he prior art addressed in the Petition is also part of Petitioner's invalidity contentions in the [parallel] litigation." Pet. 19. Petitioner stipulates that it will not, however, pursue in district court the "the prior art obviousness combinations on which trial is instituted for the claims on which trial is instituted, while trial is instituted" in this case. Ex. 1033. This stipulation mitigates to some degree the concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions, but we agree with Patent Owner that the stipulation does not fully allay such concerns. We note, for example, that Petitioner could have stipulated that it would not pursue any ground raised or that could have been reasonably raised in an *inter partes* review, that is, any ground that could have been raised under 35 U.S.C. §§ 102 or 103 on the basis of prior art patents or printed publications. *See Sand*, Paper 24 at 12 n.5; *see also Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (precedential) (finding that the petitioner's stipulation "mitigates any concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially

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conflicting decisions," where the petitioner "broadly stipulates to not pursue '*any ground* raised or that could have been reasonably raised'"). A broader stipulation of that nature might better address concerns regarding duplicative efforts and potentially conflicting decisions in a much more substantial way. *Sand*, Paper 24 at 12 n.5. Likewise, such a stipulation might help ensure that an *inter partes* review functions as a true alternative to litigation in relation to grounds that could be at issue in an *inter partes* review. *Id.* Further still, Petitioner could have expressly waived in district court any overlapping patentability or invalidity defenses. *See id.* Thus, Petitioner's stipulation reduces concerns regarding overlapping issues, but it does not eliminate them. Given the facts here, this factor weighs marginally against discretionary denial.

e. Factor 5: Whether the Petitioner and the Defendant in the Parallel Proceeding Are the Same Party

Both Petitioner and Patent Owner acknowledge that the parties in the parallel district court proceeding and this proceeding are the same. Pet. 19; Prelim. Resp. 15; Reply 4. Petitioner argues that this factor is neutral, however, because "this factor 'could weigh either in favor of, or against, exercising discretion to deny institution, depending on which tribunal was likely to address the challenged patent first,'" and "it is unknown which tribunal will address the validity of the '709 Patent first." Reply 4 (quoting *Parus*, Paper 9 at 21). Patent Owner counters that this factor favors discretionary denial because "[t]here is no uncertainty as to 'which tribunal [is] likely to address the challenged patent first,'" where "[n]either party opposed the new, earlier trial date." Sur-reply 4.

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As Petitioner is the defendant in the parallel district court proceeding, this factor does not weigh against discretionary denial. *Fintiv*, Paper 11 at 13–14.

f. Factor 6: Other Circumstances that Impact the Board's Exercise of Discretion, Including the Merits

On the record before us, the merits of Petitioner's arguments as to the challenged claims appear to be relatively strong. Petitioner explains persuasively how its proposed combinations teach or suggest the recited limitations of challenged claims 1, 4, 7, and, 16. *See* Pet. 20–58. Additionally, we are persuaded that an ordinarily skilled artisan would have modified Carrie's system to include Hawthorne's VLAN ID translation to provide for further traffic differentiation. *See, e.g.*, *id.* at 24–31.

As a separate consideration, Patent Owner argues that "if the Board were to institute, the mature stage of litigation would permit [Petitioner] to tactically use litigation discovery for an opportunity to probe [Patent Owner's] validity defenses against overlapping prior art *before* Dr. Bhattacharjee ([Petitioner's] expert) is deposed in this IPR proceeding." Prelim. Resp. 16. Patent Owner does not, however, explain why it would be prejudiced under these circumstances. Thus, Patent Owner's argument in this regard is unavailing.

Patent Owner further argues that "the Office has already evaluated the [c]hallenged [c]laims against a critical reference—Hawthorne—applied in each [g]round of [the] Petition."[5] *Id.* at 17 (citing Ex. 1002, 311–332, 365–

[5] We note that Patent Owner did not raise this argument under 35 U.S.C. § 325(d).

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377). Patent Owner asserts that "[t]he Board's resources, and those of the parties, are better spent elsewhere than on a redo of the Examiner's review of Hawthorne." *Id.* This argument also is unavailing. During prosecution of the application for the '709 patent, the Examiner relied on various combinations including Hawthorne as a secondary reference to reject the pending claims. *See* Ex. 1002, 313–322, 367–377. None of the combinations considered by the Examiner included Carrie, which Petitioner now asserts as the primary reference in this proceeding. *See id.* Moreover, the Examiner's analysis of combinations including Hawthorne is different than Petitioner's analysis of combinations including Hawthorne. For example, the Examiner's proffered reasoning for including Hawthorne as part of the combinations relied on was "to enable network nodes that implement 802.1Q VLANS to be scaled beyond 4,094 unique VLANS." *Id.* at 315, 368. By contrast, Petitioner's proffered reasoning for including Hawthorne as part of the combinations relied on is "to differentiate customer traffic forwarded to a service provider network." Pet. 24. In light of these differences, we find that our review of Hawthorne in this proceeding would not necessarily be a "redo" of the Examiner's review during prosecution.

For these reasons, the final *Fintiv* factor weighs strongly against discretionary denial.

2. Balancing of Factors

We have considered the circumstances and facts before us in view of the *Fintiv* factors. Our analysis is fact-driven, and no single factor is determinative of whether we exercise our discretion to deny institution under § 314(a). Here, Factors 1, 2, and 5 do not weigh against discretionary

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denial. Factors 3, 4, and 6, however, weigh against discretionary denial, with Factor 6 weighing strongly so. In short, the merits of Petitioner's arguments are strong. Although there are overlapping issues raised in the Petition and in the parallel proceeding, Petitioner's stipulation reduces concerns about overlap, investment in the parallel proceeding is low, and we credit Petitioner's diligence in filing its Petition. Evaluating the *Fintiv* factors with a holistic view of whether the efficiency and integrity of the system are best served by denying or instituting review, we determine that the specific facts of this case weigh in favor of instituting review. Accordingly, we decline to exercise our discretion under § 314(a) to deny institution of *inter partes* review.

B. Claim Construction

In an *inter partes* review proceeding, we construe a claim of a patent "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." *See* 37 C.F.R. § 42.100(b) (2019). That standard involves construing claims in accordance with the ordinary and customary meaning of such claims as would have been understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

Petitioner asserts that "no claim terms require construction for the purpose of evaluating the prior art in this Petition." Pet. 14. Likewise, Patent Owner asserts that "[n]o claim construction is necessary." Prelim. Resp. 20. For purposes of this Decision, we conclude that no claim term requires express interpretation at this time to resolve any controversy in this

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proceeding. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

C. Obviousness over Carrie and Hawthorne

Petitioner asserts that claims 1, 4, and 16 of the '709 patent would have been obvious over Carrie and Hawthorne. Pet. 15, 20–49. Patent Owner responds that Petitioner fails to show that an ordinarily skilled artisan would have combined Carrie and Hawthorne. Prelim. Resp. 34–57. For the reasons explained below, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on this asserted ground.

1. Overview of Asserted Prior Art

We start with an overview of the asserted prior art, namely, Carrie and Hawthorne.

a. Carrie

Carrie describes "selectively processing VLAN traffic from different networks while allowing flexible VLAN identifier assignment." Ex. 1005, 1:10–15. To illustrate, Figure 4 of Carrie is reproduced below.

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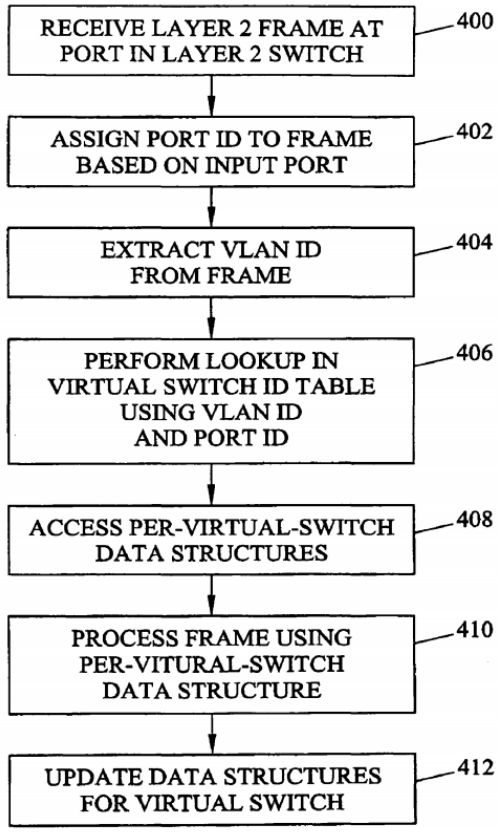


FIG. 4

Figure 4 is a flow chart of a method according to Carrie for assigning virtual switch identifiers based on port identifiers and VLAN identifiers, and selectively processing frames using these identifiers. *Id.* at 7:60–63.

Starting with step 400, a layer 2 frame with a VLAN identifier is received at a port of a layer 2 switch. *Id.* at 1:21–23, 7:64–65, Fig. 9 (frame 900 with VLAN ID). Next, at step 402, a port identifier is assigned to the frame. *Id.* at 7:65–66. Carrie notes that the port identifier may be added to the frame on entry into the switch. *Id.* at 4:26–28, 9:56–57, Fig. 9 (port identifier 902). At step 404, the VLAN identifier is extracted from the frame. *Id.* at 7:66–67. At step 406, a virtual switch identifier table is searched using the VLAN identifier and the port identifier combination to

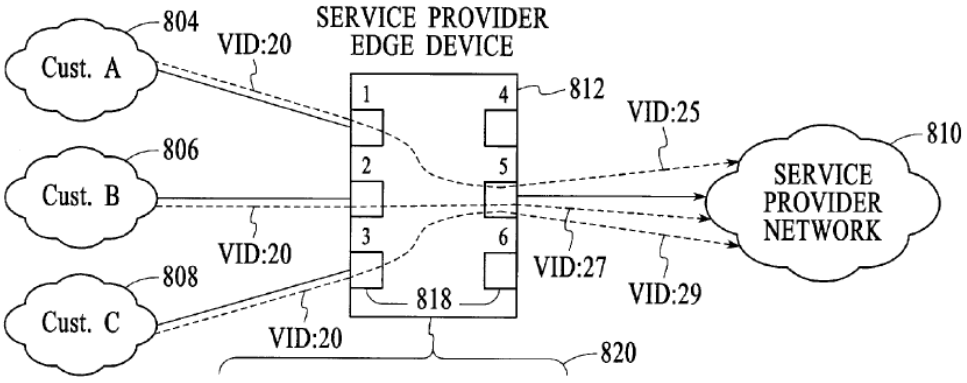
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determine a virtual switch identifier. *Id.* at 4:41–43, 7:67–8:2. The combination of port and VLAN identifiers is preferably unique. *Id.* at 4:50–51. The virtual switch identifier is then used to access a per-virtual-switch data structure at step 408, where the data structure may include a forwarding database. *Id.* at 4:43–45, 8:3–5. Thereafter, at step 410, the frame is processed according to the per-virtual-switch data structure. *Id.* at 8:5–6. For example, the frame may be forwarded to a node or nodes associated with the same virtual switch. *Id.* at 8:6–8. At step 412, the per-virtual-switch data structures are updated. *Id.* at 8:8–9.

b. Hawthorne

Hawthorne relates to forwarding traffic through a packet-based network using VLAN technology. Ex. 1006 ¶ 2. In particular, Hawthorne describes translating a VLAN ID of received VLAN traffic from an input VLAN ID to an output VLAN ID before transmitting the traffic from the network node. *Id.* ¶ 13. To illustrate, Figure 8 of Hawthorne is reproduced below.

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VLAN ID TRANSLATION TABLE

	INPUT VID	OUTPUT VID	OUTPUT PORT
PORT 1	20	25	5
PORT 2	20	27	5
PORT 3	20	29	5
PORT 5	25	20	1
PORT 5	27	20	2
PORT 5	29	20	3
	Criteria		Result

FIG. 8

Figure 8 shows an example application of VLAN ID translation according to Hawthorne, which ensures the uniqueness of VLAN traffic when the same VLAN ID is used for traffic at more than one port of a network node. *Id.* ¶ 65. For example, each of Customers A, B, and C may send traffic to the service provider edge device on VLAN ID 20, with the next hop for the traffic being to service provider network 810 via port interface 5 of the service provider edge device. *Id.* The VLAN ID translation rule at port interface 1 translates input VLAN ID 20 to output VLAN ID 25 and output port 5, the VLAN ID translation rule at port interface 2 translates input VLAN ID 20 to output VLAN ID 27 and output port 5, and the VLAN ID translation rule at port interface 3 translates input VLAN ID 20 to output VLAN ID 29 and output port 5. *Id.* Because the traffic from each input port interface is sent out of port interface 5 on different VLAN IDs, the traffic that is sent from port interface 5 can be differentiated within the service provider network based on VLAN ID alone. *Id.*

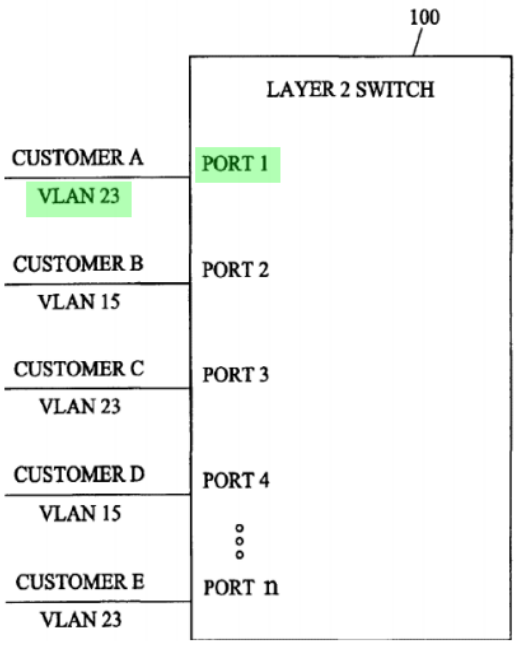
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2. Analysis

We address independent claim 1 in detail. Claim 1 is directed to a "forwarding method" that comprises five steps designated by Petitioner as steps 1.1, 1.2, 1.3, 1.4, and 1.5. Step 1.1 involves receiving a frame via an input port. Step 1.2 involves obtaining an input VLAN identifier and a destination MAC address of the received frame. Step 1.3 involves determining a virtual switching instance. Step 1.4 involves obtaining an output port and an output VLAN identifier. Step 1.5 involves communicating the received frame and the output VLAN identifier to the output port. These steps are discussed in turn.

a. Step 1.1: Receiving a Frame

Claim 1 recites "receiving, via an input port, a frame associated with a first virtual local area network (VLAN)." For this limitation, Petitioner provides an annotated version of Figure 1 of Carrie, which is reproduced below. Pet. 32.



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Figure 1 of Carrie, as annotated by Petitioner, is a block diagram of a layer 2 network and a layer 2 switch. *See* Ex. 1005, 3:51–53. The layer 2 switch has multiple ports, where each port is assigned a port identifier. *Id.* at 4:22–26, Fig. 1. Petitioner directs us to where Carrie teaches that "a layer 2 frame is received at a port of a layer 2 switch." *Id.* at 7:64–65 (cited by Pet. 31). The layer 2 frame includes a VLAN identifier. *Id.* at 1:21–23; *see also id.* at 7:66–67 ("[T]he VLAN identifier is extracted from the layer 2 frame.") (cited by Pet. 31). Networks assign VLAN identifiers to their layer 2 traffic. *Id.* at 1:31–35. In Figure 1, for example, Customer A uses VLAN identifier 23 on port 1. *Id.* at 4:33–38 (cited by Pet. 31–32).

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that Carrie teaches the recited limitation of step 1.1.

b. Step 1.2: Obtaining an Input VLAN Identifier and a Destination MAC Address

Claim 1 further recites "obtaining an input VLAN identifier (ID) representing the first VLAN and a destination media access control (MAC) address of the received frame." For this limitation, Petitioner directs us to where Carrie teaches that "the VLAN identifier is extracted from the layer 2 frame." Ex. 1005, 7:64–67 (quoted by Pet. 33). As additional support, Petitioner directs us to the flow chart in Figure 4 of Carrie, which illustrates the step "EXTRACT VLAN ID FROM FRAME." *Id.* at Fig. 4 (step 404) (cited by Pet. 33).

Petitioner also directs us to Figure 9 of Carrie, which shows that "[f]orwarding database 910 . . . receives as input the MAC destination

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address" and a virtual switch ID. Ex. 1005, 10:14–15, Fig. 9 (cited by Pet. 33–34). Carrie teaches that "[u]sing the virtual switch ID in combination with the MAC destination address allows the portion of forwarding database 910 that is specific to the virtual switch to be selected." *Id.* at 10:16–18 (cited by Pet. 33). The output of forwarding database 910 may be an output port or a flood list. *Id.* at 10:23–24. We note Carrie's teaching that "portions of the hardware illustrated in FIG. 9 may also be used to implement the processing steps illustrated in . . . FIG[]. 4." *Id.* at 9:49–54; *see also id.* at 6:39–42 (stating with respect to Figure 3, "[i]f a forwarding database entry for the received MAC destination address does not exist, the frame is flooded only onto ports associated with the same virtual switch"); *id.* at 8:5–8 (stating with respect to Figure 4, "[i]n step 410, the frame is processed using the per-virtual-switch data structure," where, "[f]or example, the frame may be forwarded or flooded to a node or nodes associated with the same virtual switch").

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that Carrie teaches the recited limitation of step 1.2.

c. Step 1.3: Determining a Virtual Switching Instance

Claim 1 further recites "determining a Virtual Switching Instance (VSI) corresponding to the combination of the input port and the input VLAN ID." For this limitation, Petitioner contends that Carrie's "switch maintains a plurality of virtual switches, where each virtual switch is a virtual switch instance identified by a virtual switch identifier." Pet. 34. As support, Petitioner directs us to where Carrie teaches that "when a layer 2

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frame is received, [a] virtual switch identifier is determined and used to access the forwarding data for that virtual switch." Ex. 1005, 6:37–39 (cited by Pet. 34–35). Specifically, the frame's "VLAN identifier and the port identifier are used to determine [the] virtual switch identifier." *Id.* at 2:65–3:2 (cited by Pet. 35); *see also id.* at code (57) (stating that "a layer 2 switch includes a virtual switch identifier data structure that associates a VLAN identifier extracted from a layer 2 frame and a port identifier corresponding to a port on which a frame is received with a virtual switch identifier") (cited by Pet. 35); *id.* at 5:37–40 (stating that "the VLAN identifiers and the corresponding port identifiers are provisioned in [a] virtual switch ID table," where "each unique combination of VLAN identifier and port identifier may be assigned to a virtual switch") (cited by Pet. 35). Carrie additionally teaches that the MAC destination address and "the virtual switch ID[are] input into forwarding database 910" to "allow[] the portion of forwarding database 910 that is specific to the virtual switch to be selected," and that "[t]he output of forwarding database 910 may be an output port, a flood list, or a multicast list." *Id.* at 10:13–18, 23–24 (cited by Pet. 36–37). According to Petitioner, Carrie's "virtual switch identifier identifies a *virtual switching instance* as claimed." Pet. 37. Petitioner relies on the declaration testimony of Dr. Bhattacharjee. *Id.* at 34–37 (citing Ex. 1003 ¶¶ 135–136, 138–139).

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that Carrie teaches the recited limitation of step 1.3.

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d. Step 1.4: Obtaining an Output Port and an Output VLAN Identifier

Claim 1 further recites "obtaining an output port and an output VLAN ID, wherein the output VLAN ID represents a second VLAN and wherein the output port and the output VLAN ID relate to the destination MAC address and the VSI." For this limitation, Petitioner relies on both Carrie and Hawthorne.

With respect to obtaining an output port, Petitioner directs us to where Carrie teaches,

> The output of multiplexer 908, **which is the virtual switch ID**, is input into forwarding database 910. Forwarding database 910 also receives as input the MAC destination address. **Using the virtual switch ID in combination with the MAC destination address** allows the portion of forwarding database 910 that is specific to the virtual switch to be selected. . . . **The output of forwarding database 910 may be an output port**, a flood list, or a multicast list, depending on the output of the lookup.

Pet. 37–38 (quoting Ex. 1005, 10:13–25) (emphasis added by Petitioner). According to Petitioner, this teaching in Carrie discloses obtaining an output port based on the virtual switch ID and the destination MAC address. *Id.* at 38 (Petitioner's annotated Figure 9 of Carrie).

With respect to obtaining an output VLAN ID, Petitioner turns to Hawthorne. Specifically, Petitioner directs us to where Hawthorne teaches "translating [an] input VLAN ID to an output VLAN ID," where the input VLAN ID identifies traffic received at a network node as belonging to a first VLAN, and the output VLAN ID identifies the traffic leaving the network node as belonging to a second VLAN. Ex. 1006 ¶ 15 (cited by Pet. 38). Petitioner also directs us to where Hawthorne describes "VLAN ID translation rules [that] specify the desired relationships between input VLAN

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IDs and output VLAN IDs." *Id.* ¶ 57 (cited by Pet. 39). For example, "VLAN ID translation rules [may] specify an input port and VLAN ID pair that translate to an output port and VLAN ID pair." *Id.* Hawthorne notes that the "VLAN ID translation rules may include additional criteria," including "a DA MAC" (i.e., destination address MAC address). *Id.* ¶¶ 54, 57.

Petitioner contends that it would have been obvious to an ordinarily skilled artisan to "utilize Hawthorne's teachings regarding its improved VLAN translation technique in combination with Carrie's system—for example, in order to differentiate customer traffic forwarded to a service provider network." Pet. 24; *see also id.* at 27–28 ("This expanded solution would have differentiated VLAN traffic from different networks not only within Carrie's layer 2 switch but also when forwarding such traffic to a service provider connected to a single output port."). As support, Petitioner asserts that Carrie "allows its switch to segregate customers' VLAN traffic from different networks even if the customers utilize the same VLAN IDs" but "does not explicitly address the problematic situation in which traffic from two different networks with the same VLAN ID is forwarded to the *same output port*—for example, an output port connected to a service provider serving both networks." *Id.* at 25–26. Petitioner further asserts that Hawthorne's "VLAN translation technique allows 'the uniqueness of each customer's VLAN traffic [to be] maintained at the output port interface'" so that "'different customers connected to different ports of a service provider edge device [] 812 [may] independently use the same VLAN IDs to send traffic' to a single service provider network 810." *Id.* at 26 (citing Ex. 1006

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¶ 65). To illustrate, Petitioner provides an annotated version of Figure 8 of Hawthorne, which is reproduced below. *Id.* at 27.

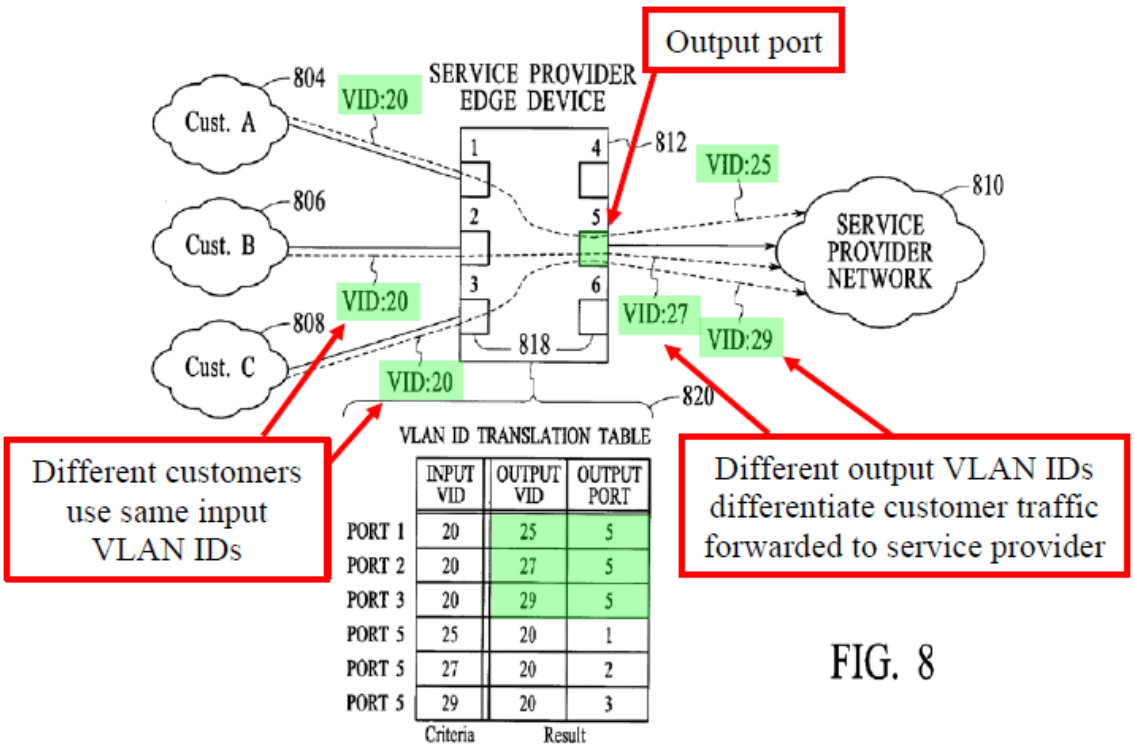


FIG. 8

Figure 8 of Hawthorne, as annotated by Petitioner, "depicts an example application of VLAN ID translation that ensures the uniqueness of VLAN traffic when the same VLAN ID is used for traffic at more than one port of the network node." *See* Ex. 1006 ¶ 32. According to Petitioner, an ordinarily skilled artisan would have "modif[ied] Carrie's layer 2 switch such that it translated an input VLAN ID of a received frame into an output VLAN ID, in the manner taught by Hawthorne," in order to "augment Carrie's virtual switch solution with Hawthorne's known VLAN translation technique to create a more complete solution to the problem of different customer networks using the same VLAN ID." Pet. 27. Petitioner adds that, "[a]s an aspect of this combination, it would have been obvious that Carrie's output VLAN ID would relate to a particular virtual switch because the same

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variables that are used to select the output VLAN ID are also used to select the virtual switch identifier for that particular virtual switch—*i.e.*, input port and input VLAN ID." *Id.* at 40–41. Petitioner relies on the declaration testimony of Dr. Bhattacharjee. *Id.* at 24–31, 40–41 (citing Ex. 1003 ¶¶ 118–122, 124–128, 144).

In response, Patent Owner makes several arguments. For instance, Patent Owner argues that Petitioner's obviousness analysis is deficient because Petitioner "has not shown Carrie's system would be capable of accommodating Hawthorne's VLAN translation techniques," and that "the resulting system also would not differentiate VLAN traffic forwarded on a shared output port." Prelim. Resp. 37; *see also id.* at 60 ("The Petition fails to confront substantial evidence that Carrie's system would not accommodate Hawthorne's VLAN translation techniques."). As support, Patent Owner asserts that "when a virtual switch is associated with two or more VLANs on a single port, Carrie's system references the *same* per-virtual switch forwarding database for each VLAN on the port—and thus the forwarding information *is not differentiated by VLAN ID*," and "[w]hen a virtual switch is associated with a single VLAN across multiple ports, Carrie's system then uses the *same* per-virtual switch forwarding database for each port associated with a particular VLAN ID—and thus the forwarding information *is not differentiated by port*." *Id.* at 40. Patent Owner further asserts that, "[i]n these cases, the specific input port and input VLAN ID parameters of a frame cannot be unambiguously recovered based on a virtual switch identifier alone since multiple input port-input VLAN ID pairs are associated with the same virtual switch identifier." *Id.* at 40–41. According to Patent Owner, "Hawthorne's system, by contrast, does not

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exhibit this same phenomenon since Hawthorne (1) defines forwarding information on a 'per-port interface' basis, (2) maps directly from inputs (e.g., input VLAN ID, port interface, DMAC) to outputs (e.g., output port, output VLAN ID) without an intermediate construct like a virtual switch, and (3) uses translation rules that ensure customers are differentiated by output VLAN IDs." *Id.* at 41; *see also id.* at 59. Patent Owner contends, "With this context, the Petition plainly errs in alleging that the system resulting from the proposed Carrie-Hawthorne combination would have been capable of '***differentiating VLAN traffic having the same input VLAN ID*** when forwarding such traffic to a common service provider network.'" *Id.*; *see also id.* at 41–50.

Petitioner responds that "Patent Owner relies on embodiments in Carrie (Figs. 5 and 6) that are *meaningfully different* than the embodiment relied upon in the Petition (Figs. 1–4) for the claimed 'Virtual Switching Instance.'" Reply 5. Petitioner notes specifically that "the virtual switch of FIG. 4 processes frames 'based on port identifier ***and*** VLAN identifier,' whereas the virtual switch of FIG. 5 processes frames 'based on port identifier ***or*** VLAN identifier.'" *Id.* With respect to Patent Owner's "alleg[ation] that there is no VLAN differentiation 'when a virtual switch is associated with two or more VLANs on a single port,'" Petitioner contends that "[t]he virtual switch of Figs. 3 and 4 . . . ***cannot*** be associated with 'two or more VLANs on a single port' because it is identified by 'each ***unique combination*** of VLAN identifier and port identifier.'" *Id.*

In its Sur-reply, Patent Owner counters that Petitioner impermissibly "attempt[s] to 'pick and choose' between FIGS. 1–4, 5, and 6." Sur-reply 4–5 (citing *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d

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443, 448 (Fed. Cir. 1986)). Patent Owner further contends that Petitioner nonetheless "repeatedly cites FIG. 9 and its corresponding text," where "FIG. 9 depicts an implementation of Carrie's system that examines whether all VLANs on a port are assigned to a single virtual switch—precisely what FIG. 5 teaches." *Id.* Patent Owner adds that "Carrie's description of FIG. 2 expressly provides, like FIG. 5, that 'table 206 may be indexed based on port identifier if all VLANs on a particular port are assigned to the same virtual switch.'" *Id.* at 5. According to Patent Owner, "[t]he evidence confirms this teaching provides a special method of determining VSI for certain ports, but—critically—does *not* imply that the methods discussed at col. 5:3–5 / FIG. 4 and 5:5–7 / FIG. 5 are implemented in mutually exclusive systems." *Id.*

By focusing on whether Carrie's system would have been capable of accommodating Hawthorne's VLAN translation techniques, Patent Owner disregards Hawthorne's broader teaching of receiving VLAN traffic at a network node and translating the VLAN ID of the traffic from an input VLAN ID to an output VLAN ID before the traffic is transmitted from the network node. Our reviewing court has stressed that "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference." *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Instead, "the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *Id.*

As Petitioner points out, Carrie's system "allows its switch to segregate customers' VLAN traffic from different networks even if the customers utilize the same VLAN IDs" but "does not explicitly address the

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problematic situation in which traffic from two different networks with the same VLAN ID is forwarded to the *same output port*—for example, an output port connected to a service provider serving both networks." Pet. 25–26. Petitioner explains that it is for this reason an ordinarily skilled artisan would have modified Carrie's system to provide for translated VLAN IDs based on Hawthorne's teachings. *Id.* at 24–31.

On this record, we find that Petitioner's explanation provides sufficient rationale for why an ordinarily skilled artisan would have combined the teachings of Carrie and Hawthorne. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). In addition, we note that "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton," and, in modifying Carrie's system to provide for VLAN ID translation, the person of ordinary skill would have made any necessary additional modifications so that Carrie's system could accommodate VLAN ID translation. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Patent Owner further argues that Petitioner's obviousness analysis "disregard[s] Carrie's teaching away, or at least strong preference, against VLAN translation like that taught in Hawthorne." Prelim. Resp. 50; *see also id.* ("[T]he Petition disregards Carrie's express preference to avoid cross-VLAN switching and VLAN ID translation as disclosed in Hawthorne."); *id.* at 59 ("Carrie is concerned with intra-VLAN bridge forwarding and expressly avoids inter-VLAN switching or VLAN ID translation."); *id.* at 60 ("The Petition fails to confront . . . evidence that [a person of ordinary skill in the art] would not have sought to cross Carrie's express preference against

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VLAN translation."). Patent Owner asserts that "Carrie does ***not*** seek to bridge traffic among ***different*** VLANs or otherwise allow frames to be diverted to networks with VLAN IDs different from those initially specified in the frame at the time it is received by the Layer 2 switch." *Id.* at 52. As support, Patent Owner directs us to where Carrie teaches that "[i]t is important to maintain separate forwarding databases and ARP caches ***to prevent frames intended for one VLAN from being sent over another VLAN***" based on "security reasons" as well as a desire to avoid "unnecessarily wast[ing] network bandwidth." *Id.* (quoting Ex. 1005, 1:41–43, 5:45–48) (emphasis added by Patent Owner). According to Patent Owner, this teaching shows that "Carrie explicitly sought to 'prevent' the very technique that is central to Petitioner's hindsight-infused modification." *Id.*

Patent Owner also directs us to portions of the prosecution history file for Carrie. In particular, Patent Owner directs us to where the applicant during prosecution "amended the claims to distinguish Hawthorne by explicitly clarifying that Carrie's system processes frames 'using data associated with [a] . . . virtual switch ***without modifying the [] VLAN identifier***,'" and argued that "[t]here is absolutely no teaching or suggestion in Hawthorne of selectively processing a packet using a virtual switch ***without modifying the VLAN identifier*** of the packet." *Id.* at 53 (quoting Ex. 2014, 19, 27) (emphases added by Patent Owner).

We disagree with Patent Owner. Carrie's emphasis on "prevent[ing] frames intended for one VLAN from being sent over another VLAN" (*see* Ex. 1005, 5:44–47) does not teach away from using cross-VLAN switching or VLAN translation, as Patent Owner contends. Nor does it indicate a

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preference against using cross-VLAN switching or VLAN translation. Rather, it addresses the problem of "[f]looding traffic onto another user's network" that was not intended to receive the traffic. *See* Ex. 1005, 1:41–43. To illustrate, Carrie provides an example scenario:

> [N]etwork A may assign the VLAN identifier 23 to its layer 2 traffic. Network B may also assign the VLAN identifier 23 to its layer 2 traffic. When layer 2 frames destined for network A arrive at a layer 2 switch, if a specific layer 2 forwarding table entry does not exist for the destination in network A, the frame intended for the destination in network A will be flooded to networks A and B.

Id. at 1:34–40. Carrie explains that such "[f]looding . . . is undesirable for security reasons and it also unnecessarily wastes network bandwidth." *Id.* at 1:41–43. Contrary to Patent Owner's position, this says nothing about preventing cross-VLAN switching or VLAN translation.

Indeed, using VLAN translation may increase security, consistent with Carrie's goal. To illustrate, Hawthorne provides a different example scenario:

> [C]ustomers B and C 106 and 108 want to forward traffic through the Service Provider Edge Device 112 to the Service Provider Network 110 using the same VLAN ID (i.e., VLAN ID 20) as the VLAN ID that is being used by Customer A 104. If the traffic from all three of the customers is output on the same port of the Service Provider Edge Device with the same VLAN ID, the customer-specific traffic cannot be differentiated within the Service Provider Network based on VLAN ID alone and as a result additional packet processing must be performed within the service provider network to prevent different customers from seeing each other's traffic.

Ex. 1006 ¶ 9, Fig. 1. Hawthorne teaches that VLAN translation allows for "traffic from each input port interface [to be] sent out port interface 5 on

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different VLAN IDs" and then "differentiated within the service provider network based on VLAN ID alone," thereby "prevent[ing] different customers from seeing each other's traffic." *Id.* ¶¶ 9, 65, Fig. 8.

We note Patent Owner's citations to the prosecution history file for Carrie. The applicant's remarks during prosecution distinguishing Carrie over Hawthorne do not support Patent Owner's teaching away argument. As discussed above, Petitioner proposes that one reason for combining Carrie and Hawthorne is to differentiate customer traffic, which, in turn, increases security. Pet. 24–27; Ex. 1005, 1:34–43; Ex. 1006 ¶¶ 9, 65. That there is "no teaching or suggestion in Hawthorne of selectively processing a packet using a virtual switch without modifying the VLAN identifier of the packet" (*see* Ex. 2014, 27) does not sufficiently defeat Petitioner's proposed reason for combining Carrie and Hawthorne.

Patent Owner additionally argues that Petitioner's obviousness analysis is defective because "it fails to explain how the proposed Carrie-Hawthorne system would coordinate the assignment of unique output VLAN IDs to networks on different virtual switches." Prelim. Resp. 54. Patent Owner directs us to where Hawthorne teaches that "each port interface can utilize the full range of available VLAN IDs independently of the other port interfaces as long as input VLAN IDs and output VLAN IDs are associated with each other by VLAN ID translation rules." *Id.* at 55 (quoting Ex. 1006 ¶ 14) (emphasis by Patent Owner omitted). Patent Owner asserts that "Hawthorne's approach requires coordinating assignments of output VLAN IDs in a manner that ensures different customers or different networks (typically on different port interfaces) are not assigned the same VLAN ID." *Id.* Patent Owner further asserts that "Carrie adopts a markedly different

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approach," and directs us to where Carrie teaches that "[i]t is important to maintain separate forwarding databases . . . to prevent frames intended for one VLAN from being sent over another VLAN." *Id.* at 56 (quoting Ex. 1005, 5:45–48) (emphasis by Patent Owner omitted). According to Patent Owner, "Carrie's express preference for managing per-virtual switch forwarding databases in an independent manner thus places it squarely at odds with the need for coordinated distribution of output VLAN IDs as taught by Hawthorne." *Id.* Patent Owner adds that Petitioner's "bald assertion that 'any modification of Carrie's teachings[] . . . to accommodate the teachings of Hawthorne would have been within the level of ordinary skill in the art' is unsupported and insufficient for Petitioner to meet its burden here." *Id.* at 57. Patent Owner relies on the declaration testimony of Dr. Davis. *Id.* at 54–57 (citing Ex. 2013 ¶¶ 85–90).

We disagree. Nothing in the cited portions of the record before us indicates that managing virtual switch databases in an independent manner is "squarely at odds" with coordinating the distribution of output VLAN IDs, as Patent Owner contends. *See* Prelim. Resp. 56. Dr. Davis acknowledges that Petitioner's "proposed Carrie-Hawthorne system would presumably require a mechanism that ensures an output VLAN ID specified in one forwarding database is not also specified in another forwarding database for forwarding frames from a different source." Ex. 2013 ¶ 88. According to Dr. Davis, however, "Carrie intentionally maintains the forwarding information for each virtual switch independent of others—which is contrary to the type of scheme that would be necessary in a Carrie-Hawthorne system where coordination would be necessary to ensure unique output VLAN IDs were assigned to each network source." *Id.* ¶ 89. It is not clear to us why

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maintaining Carrie's virtual switch databases independently of one another is "contrary" to coordinating the assignment of output VLAN IDs. Patent Owner points out that the purpose of maintaining Carrie's forwarding databases separately is "to prevent frames intended for one VLAN from being sent over another VLAN." Prelim. Resp. 54 (citing Ex. 1005, 5:45–48). Likewise, the purpose of providing translated VLANs in Hawthorne is to allow for traffic differentiation, which helps "prevent different customers from seeing each other's traffic." Ex. 1006 ¶¶ 9, 65. In light of this shared purpose and on the record before us, the teachings in Carrie and Hawthorne seem more complementary than contrary.

Lastly, Patent Owner notes Petitioner's assertion that "the same variables that are used to select the output VLAN ID are also used to select the virtual switch identifier for that particular virtual switch—i.e., input port and input VLAN ID," and argues that, "[a]s a matter of logic, however, it does not follow from this that 'output VLAN ID [would] relate to a particular virtual switch' as alleged in the Petition." Prelim. Resp. 60 (quoting Pet. 40–41); *see also id.* at 60–61.

On the present record, Patent Owner's argument is unavailing. Petitioner's assertion is meant to show that "Carrie's switch already obtains from the received frame the specific input parameters necessary to determine an output VLAN ID in the manner taught by Hawthorne." Pet. 30. Dr. Bhattacharjee further explains that "in one example implementation the output VLAN ID may be stored in Carrie's per-virtual-switch forwarding database and would be associated with a destination MAC address and output port." Ex. 1003 ¶ 144 (cited by Pet. 40–41). As support, Dr. Bhattacharjee directs us to where Hawthorne discloses "an ordered data

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structure of table entries" that "include forwarding information that is used to forward traffic through the network node," where "the forwarding information within each table entry includes a MAC address (typically the destination address MAC address or 'DA MAC'), a translated VLAN ID, and an output port or ports." Ex. 1006 ¶ 54 (cited by Ex. 1003 ¶ 144). According to Dr. Bhattacharjee's example implementation, the input parameters (i.e., the input port ID and the input VLAN ID) are used to determine the virtual switch ID, which, in turn, is used to access a data structure, such as a forwarding database, that includes the output port ID and the output VLAN ID. This implementation sufficiently shows that the output VLAN ID relates to the virtual switch ID.

We note Patent Owner's argument that, in the context of Dr. Bhattacharjee's example implementation of Petitioner's proposed combination of Carrie and Hawthorne, "the variables used to select a virtual switch identifier are the input port and input VLAN ID of the received frame," whereas "the only variable used to identify an output VLAN ID (after an appropriate forwarding database is accessed based on the virtual switch identifier) is the destination MAC address of the frame." Prelim. Resp. 64. We interpret Petitioner's assertion to mean that Carrie uses the input port ID and the input VLAN ID to "select" or determine the virtual switch ID, and Hawthorne uses the same input variables to "select" or determine the output VLAN ID based on VLAN ID translation rules. Our interpretation is supported by the portions of Carrie and Hawthorne that are cited by Petitioner. *See* Ex. 1005, 2:65–3:2 ("[T]he VLAN identifier and the port identifier are used to determine a virtual switch identifier.") (cited by Pet. 40–41); Ex. 1006 ¶ 57 ("[T]he VLAN ID translation rules specify an

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input port and VLAN ID pair that translate to an output port and VLAN ID pair.") (cited by Pet. 40–41).

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that its proposed combination of Carrie and Hawthorne teaches the recited limitation of step 1.4. We also are persuaded that Petitioner's proffered reasoning for modifying Carrie's system to include Hawthorne's VLAN ID translation, namely, to provide for further traffic differentiation, is sufficient for institution.

e. Step 1.5: Communicating the Received Frame and the Output VLAN Identifier to the Output Port

Lastly, claim 1 recites "communicating the received frame and the output VLAN ID to the obtained output port, wherein the output VLAN ID is different from the input VLAN ID." For this limitation, Petitioner directs us to where Carrie describes a switch fabric that "switches frames between input and output ports." Ex. 1005, 5:20–21, Fig. 2 (cited by Pet. 41–42). Petitioner also directs us to where Hawthorne teaches that an "L2 forwarding engine attaches the translated VLAN ID to the traffic and forwards the traffic to the output port." Ex. 1006 ¶ 60 (quoted by Pet. 42) (emphasis by Petitioner omitted). Hawthorne teaches that the translated (or output) VLAN ID is different than the input VLAN ID. Ex. 1006, code (57), ¶ 43, Fig. 2 (cited by Pet. 43). According to Petitioner, "it would have been obvious to a [person of ordinary skill in the art] that Carrie's switch—when modified in view of Hawthorne to determine an output VLAN ID—would have sent the

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determined output VLAN ID to the output port so that the frame may be tagged before transmission." Pet. 42–43.

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that its proposed combination of Carrie and Hawthorne teaches the recited limitation of step 1.5.

3. Summary

In view of the foregoing, we determine that Petitioner has demonstrated a reasonable likelihood of showing that claim 1 would have been obvious over Carrie and Hawthorne. As noted above, claims 4 and 16 depend from claim 1. Having reviewed Petitioner's arguments asserting that claims 4 and 16 would have been obvious over Carrie and Hawthorne (*see* Pet. 44–49), we also determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertion as to these dependent claims.

D. Obviousness over Carrie, Hawthorne, and Dobbins

Petitioner asserts that claim 7 of the '709 patent would have been obvious over Carrie, Hawthorne, and Dobbins. Pet. 15, 51–58. Patent Owner responds that Petitioner fails to show that an ordinarily skilled artisan would have combined Carrie, Hawthorne, and Dobbins. Prelim. Resp. 57–65. For the reasons explained below, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on this asserted ground.

We provided an overview of Carrie and Hawthorne above. *See supra* Part III.C.1. Before addressing the parties' arguments, we additionally provide an overview of Dobbins.

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1. Dobbins

Dobbins relates to providing connection-oriented services for switched data communications networks. Ex. 1007, 1:19–24. For example, Dobbins describes a traffic service, which is responsible for creating, rerouting, and tearing down connections within the switching fabric. *Id.* at 16:44–45. The traffic service may be implemented by three types of switches, namely, an ingress switch, an egress switch, and an intermediate switch. *Id.* at 16:45–47. The ingress switch is attached to the source user, the egress switch is attached to the destination user, and any intermediate switch sits along the path. *Id.* at 16:50–56.

In describing the traffic service, Dobbins provides a general overview of the call origination process, which involves the ingress switch. *Id.* at 17:1–7. To illustrate, Figure 7 of Dobbins is reproduced below.

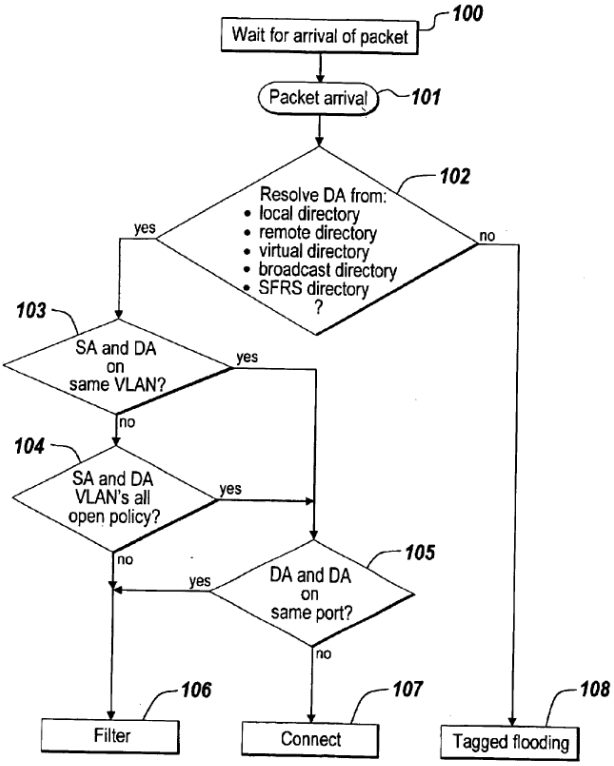


Fig. 7A

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Figure 7 is a flowchart of a general call processing method that the ingress switch performs. *Id.* at 7:12–13. When the ingress switch receives a packet at step 101, it determines the source address and the destination address, and it notes the switch port at which it receives the packet. *Id.* at 17:7–10. Next, at step 102, the ingress switch resolves the destination MAC address. *Id.* at 17:10–24. At step 103, the ingress switch checks whether the source address and the destination address are on the same VLAN (i.e., whether they have the same VLAN ID). *Id.* at 17:25–28. If the source address and the destination address have the same VLAN ID, then the ingress switch determines whether the source and the destination are on the same switch port at step 105. *Id.* at Fig. 7A. If the source and destination are not on the same port, then a connection is established at step 107; otherwise, the packet is filtered (i.e., dropped) at step 106. *Id.* at 17:34–39.

2. Analysis

Claim 7 depends from claim 1 and recites the additional step of "abandoning the received frame prior to communicating, if it is determined that the output port is the same as the input port and the output VLAN ID is the same as the input VLAN ID." For this limitation, Petitioner provides an annotated version of Figure 7A of Dobbins, which is reproduced below. Pet. 57.

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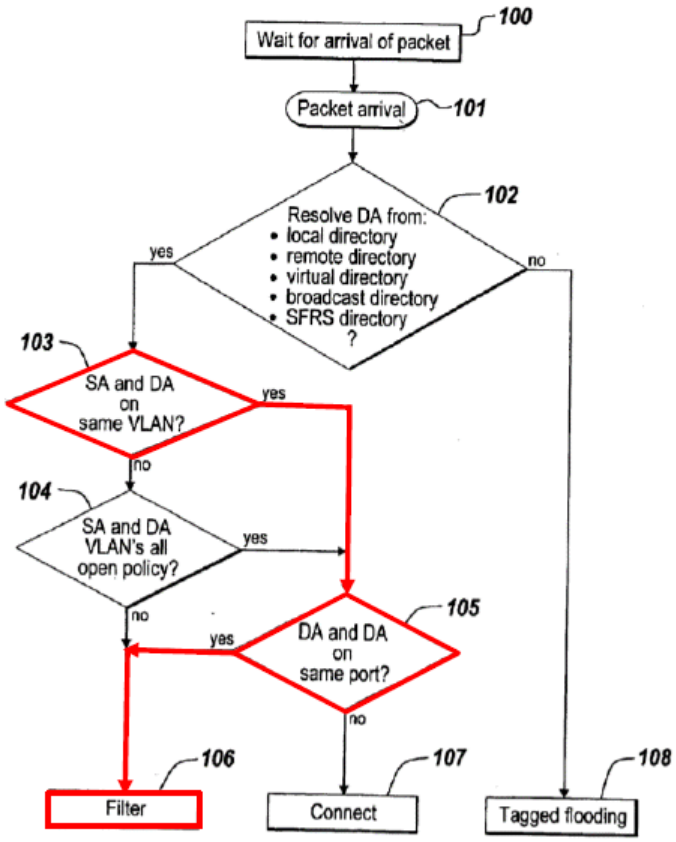


Figure 7, as annotated by Petitioner, is a flowchart of a general call processing method. *See* Ex. 1007, 7:12–13. Petitioner asserts that "Dobbins teaches that a received packet is 'filtered' or 'dropped' (*i.e.*, '*abandoning*') if the 'source and destination are on the same port' and the source and destination addresses 'have the same VLAN-ID.'" Pet. 56 (citing Ex. 1007, 17:34–39, Fig. 7A). Petitioner further contends that an ordinarily skilled artisan "would have found it obvious to utilize Dobbins[']s filtering technique in the context of Carrie's forwarding method (as modified by Hawthorne) so that network bandwidth is efficiently utilized, for example by preventing looping." *Id.* at 57–58; *see also id.* at 52 ("[A] well-known and conventional way to increase the network efficiency of a layer 2 switch was to prevent a frame being unnecessarily forwarded back to the port from which it was received—for example to prevent 'looping.'"); *id.* at 51–55. Petitioner relies

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on the declaration testimony of Dr. Bhattacharjee. *Id.* at 51–55, 57–58 (citing Ex. 1003 ¶¶ 237–243, 247–248).

Patent Owner responds that "Dobbins is not relied upon to cure any of the deficiencies . . . with respect to the Carrie-Hawthorne combination" discussed above regarding claim 1, and that Petitioner's asserted ground of obviousness over Carrie, Hawthorne, and Dobbins "is deficient" for the same reasons. Prelim. Resp. 57–58. As discussed above, however, we are persuaded that Petitioner's proposed combination of Carrie and Hawthorne teaches the recited limitations of claim 1. *See supra* Part III.C.2. We also are persuaded that Petitioner's proffered reasoning for modifying Carrie's system to include Hawthorne's VLAN ID translation, namely, to provide for further traffic differentiation, is sufficient for institution. *See id.* Patent Owner does not otherwise dispute Petitioner's obviousness analysis regarding claim 7. *See generally* Prelim. Resp.

Based on the record before us, we are persuaded that Petitioner has shown sufficiently for purposes of this Decision that its proposed combination of Carrie, Hawthorne, and Dobbins teaches the recited limitation of claim 7. We also are persuaded that Petitioner's proffered reasoning for modifying the proposed combination of Carrie and Hawthorne to include Dobbins' filtering technique, namely, to increase network efficiency, is sufficient for institution.

3. Summary

In view of the foregoing, we determine that Petitioner has demonstrated a reasonable likelihood of showing that claim 7 would have been obvious over Carrie, Hawthorne, and Dobbins.

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IV. CONCLUSION[6]

For the foregoing reasons, Petitioner has demonstrated on the record before us a reasonable likelihood that it will prevail in showing that claims 1, 4, 7, and 16 of the '709 patent are unpatentable. We have not made a final determination, however, with respect to the patentability of these claims.

V. ORDER

For the reasons given, it is

ORDERED that *inter partes* review is instituted as to all the challenged claims of the '709 patent, namely, claims 1, 4, 7, and 16, based on all the grounds presented in the Petition:

A. Obviousness under 35 U.S.C. § 103 of claims 1, 4, and 16 over Carrie and Hawthorne; and

B. Obviousness under 35 U.S.C. § 103 of claim 7 over Carrie, Hawthorne, and Dobbins; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this Decision.

[6] As noted above, Petitioner filed two petitions challenging the patentability of certain claims of the '709 patent. *See supra* Part II.A. The parties dispute whether both petitions merit consideration before the Board. Paper 2; Paper 8. Because in a separate paper we deny instituting trial in IPR2020-01143, we do not address the parties' further dispute. *See supra* Part II.A.

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