

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.,
Petitioner

v.

MOBILITY WORKX, LLC,
Patent Owner

Case IPR2018-01150
Patent 8,213,417 B2

Before WILLIAM M. FINK, *Vice Chief Administrative Patent Judge*,
MELISSA A. HAAPALA, *Acting Vice Chief Administrative Patent Judge*,
and KARA L. SZPONDOWSKI, *Administrative Patent Judge*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Unified Patents Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 1–7 of U.S. Patent 8,213,417 B2, issued on July 3, 2012 (Ex. 1001, “the ’417 patent”). Mobility Workx, LLC (“Patent Owner”) filed a preliminary response (Paper 7, “Prelim. Resp.”) to the Petition. With our authorization, Petitioner filed a reply to the Preliminary Response (Paper 8, “Reply”). We have jurisdiction under 35 U.S.C. § 314.

Institution of an *inter partes* review is authorized when “the information presented in the petition . . . and any response . . . 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.” 35 U.S.C. § 314(a). Having considered the Petition, the Preliminary Response, the Reply, and the associated evidence, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we institute an *inter partes* review as to all challenged claims and all grounds raised in the Petition.

II. BACKGROUND

A. *Related Proceedings*

The parties advise the ’417 patent is the subject of two patent infringement lawsuits in the Eastern District of Texas:

Mobility Workx, LLC v. Verizon Communications, Inc. et al., 4-17-cv-00872 (E.D. Tex.), filed Dec. 18, 2017; and

Mobility Workx, LLC v. T-Mobile US, Inc. et al. 4-17-cv-00567 (E.D. Tex.), filed Aug. 14, 2017. Pet. 57; Paper 5, 2.

B. Real Party In Interest

The statute governing *inter partes* review proceedings sets forth certain requirements for a petition for *inter partes* review, including that “the petition identif[y] all real parties in interest.” 35 U.S.C. § 312(a)(2); *see also* 37 C.F.R. § 42.8(b)(1) (requiring identification of real parties-in-interest in mandatory notices). Petitioner identifies Unified Patents, Inc. as the sole real party in interest and states “[n]o other party exercised control or could exercise control over Petitioner’s participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial.” Pet. 57.

In its Preliminary Response, Patent Owner argues the Petition is deficient in addressing the identities of the real parties in interest and that Petitioner is required to “disclose its relationships to parties presently involved in litigation concerning the ’417 patent and demonstrate an absence of privies in those parties.” Prelim. Resp. 14 (citing *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336 (Fed. Cir. 2018)). Patent Owner argues this is necessary “so as to ensure proper estoppel effect attaches to them from any final decision in the IPR.” *Id.* Patent Owner cites to several statements on Petitioner’s web site in support of its argument. *Id.* at 15–16.

Petitioner filed a Reply addressing Patent Owner’s arguments as to this issue. Petitioner argues, *inter alia*, that Patent Owner has not brought Petitioner’s real party in interest identification into dispute because it has not presented sufficient evidence. Reply 2–3. Petitioner further argues neither *Applications in Internet Time* nor any other statute or regulation requires a petitioner to disclose all the relationships it may have to parties involved in litigation. *Id.* at 3. In addition, Petitioner argues it has properly identified

itself as the sole real party in interest and submitted the Declaration of Kevin Jakel, CEO and Co-Founder of Petitioner, in support of its argument. *Id.* at 4–7; *see* Ex. 1009.

“[A]n IPR petitioner’s initial identification of the real parties in interest should be accepted unless and until disputed by a patent owner.” *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237 (2018). To put the issue into dispute, “a patent owner must produce *some* evidence that tends to show that a particular third party should be named a real party in interest. A mere assertion that a third party is an unnamed real party in interest, without any support for that assertion, is insufficient to put the issue into dispute.” *Id.*

On this record, and at this stage of the proceedings, the evidence presented by Patent Owner is insufficient to put the issue into dispute. Specifically, Patent Owner has presented no evidence that tends to show that either Verizon Communications, Inc. or T-Mobile U.S., the two parties in litigation, should have been named a real party in interest. Rather, Patent Owner’s evidence consists solely of generic statements from Petitioner’s web page that generally describe Petitioner’s business, but do not refer to either of the two parties. Accordingly, on this record, we are not persuaded the Petition should be denied for failure to name all real parties in interest.

C. The ’417 Patent (Ex. 1001)

The ’417 patent issued from Application No. 12/718,185 claiming benefit of the filing date of an earlier filed application, which claims benefit of Provisional Application No. 60/491,436 filed July 31, 2003. Ex. 1001, 1:7–11. The ’417 patent is titled “System, Apparatus, and Methods for Proactive Allocation of Wireless Communication Resources” and is

generally directed to allocation of communications resources in a communications network. Ex. 1001, Abstract, 1:17–19.

Mobile communication systems comprise mobile nodes (e.g., cell phones) that communicate with each other through a series of base stations that serve distinct cells. *Id.* at 1:28–30, 4:60–5:8. As the mobile node moves from one cell to another, it establishes a new connection with a new base station. *Id.* at 1:31–35. The mobile node must be able to let other nodes know where it can be reached when it is moving. *Id.* at 1:36–39. Typically, the mobile node registers with a home agent so the home agent can remain a contact point for other nodes that want to exchange messages or otherwise communicate with the mobile node as it moves from one location to another. *Id.* at 1:39–44, 5:9–17. Accordingly, a mobile node may use two IP addresses, one being a fixed home address and one being a care-of address, where the care-of address changes as the mobile node moves between networks. *Id.* at 1:45–49. When the mobile node links to a network other than the one in which its home agent resides, the mobile node is said to have linked to a foreign network. *Id.* at 1:49–52. The mobile node, therefore, receives an IP address from the home network, and when it moves to a foreign network and establishes a point of attachment by registering with a foreign agent, it receives a care-of address assigned by the foreign network. *Id.* at 1:52–56; 5:47–54.

According to the '417 patent, delays can occur in setting up a new communication link when the mobile node is handed off from one foreign agent to another because the new communication link cannot be set up until the mobile node arrives in the new foreign agent's physical region of coverage. *Id.* at 2:20–35, 6:4–11. In addition, data packets may be lost if

they arrive during the time when set up is being established. *Id.* at 2:36–38, 6:12–14. The invention in the '417 patent seeks to reduce these problems by causing communication network resources to be allocated proactively rather than reactively. *Id.* at 2:52–54. The '417 patent accomplishes this through the use of two different types of “ghost entities” that can act on behalf of a mobile node and a foreign agent. *Id.* at 2:44–47.

A ghost mobile node acts on behalf of a mobile node and “can be a virtual node and need not reside at the same physical location as the mobile node.” *Id.* at 6:20–22. The ghost mobile node operates by signaling the foreign agent before the mobile node arrives in the foreign agent’s physical region of coverage, based upon the predicted future state of the mobile node. *Id.* at 6:27–38. The predicted future state of the mobile node may be based upon, for example, an estimated location, trajectory, or speed of the mobile node. *Id.* at 6:38–46. Based upon this predicted future state, the ghost mobile node determines which foreign agent is likely to serve as the mobile node’s next communications link and signals that foreign agent. *Id.* at 8:58–62. This signal can be a registration request to cause an allocation of communications resources in the same way as would be performed if the mobile node were physically present in the foreign agent’s region of coverage. *Id.* at 9:7–17. Therefore, the signal results in preemptive setup that is performed before the mobile node arrives in the foreign agent’s coverage area. *Id.* at 9:54–56.

A ghost foreign agent acts on behalf of a foreign agent, and notifies the mobile node of the existence of a next foreign agent by transmitting an advertisement from the currently connected foreign agent. *Id.* at 10:17–21. In this way, the ghost foreign agent makes the mobile node aware of the

foreign agent before the mobile node arrives in the coverage region of the foreign agent. *Id.* at 10:26–28. Moreover, the vector of care-of addresses is included in the advertisement. *Id.* at 10:30–34.

D. Exemplary Claims

Among the challenged claims, claims 1 and 7 are independent. Independent claims 1 and 7 (reproduced below) are representative.

1. A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:

- at least one mobile node;
- at least one home agent;
- at least one foreign agent;

a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and

a ghost-mobile node that creates replica IP messages on behalf of a mobile node, the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.

7. A method, in a mobile node, for speeding handover, comprising the steps of:

- updating, in a mobile node, a location in a ghost mobile node;

determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;

submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and

upon completing the handover, updating a registration in the mobile node.

E. The Prior Art

Petitioner relies on the following references (*see* Pet. 2), as well as the Declaration of Dr. Zygmunt Haas (Ex. 1006):

Reference	Exhibit(s)	Patent/Printed Publication
Liu	1003	U.S. Patent No. 5,825,759 to Liu issued Oct. 20, 1998
Gwon	1004	U.S. Patent Pub. No. 2002/0131386 A1 to Gwon published Sept. 19, 2002
Lau	1005	U.S. Patent No. 7,536,482 B1 to Lau filed Feb. 4, 2003 and issued May 19, 2009
IETF RFC 2402	1008	Internet Engineering Task Force Request for Comment 2402 IP (November 1998)

F. The Asserted Grounds

For purposes of the Petition, Petitioner assumes all challenged claims are entitled to the July 31, 2003 priority date. Pet. 1. The specific statutory grounds of unpatentability, claims challenged, and prior art relied on for each ground are summarized in the table below. *See* Pet. 2.

Ground	Claim(s) Challenged	Basis	References
1	1, 5, 6	§ 103(a)	Liu in view of Gwon
2	2, 3	§ 103(a)	Liu in view of Gwon and Lau
3	4	§ 103(a)	Liu in view of Gwon and IETF RFC 2402
4	7	§ 103(a)	Liu in view of Lau

II. ANALYSIS

We turn now to Petitioner’s asserted grounds of unpatentability and Patent Owner’s arguments in its Preliminary Response to determine whether Petitioner has met the threshold standard of 35 U.S.C. § 314(a).

A. *Claim Interpretation*

Petitioner proposes a construction of the term “advertisement” as recited in independent claim 1 and dependent claim 4. Pet. 8. Patent Owner does not address Petitioner’s proposed construction.

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2016); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). However, only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Other than as discussed below in Section F.1.b, we determine that it is unnecessary to expressly construe any claim terms at this time to resolve the disputed issues before us.

B. Summary of Prior Art

1. Liu (Ex. 1003)

Petitioner contends Liu issued on October 20, 1998, and, therefore, is prior art under (pre-AIA) 35 U.S.C. § 102(b). Pet. 9. Patent Owner does not dispute these contentions. Based on the present record, we agree Liu is prior art under 35 U.S.C. § 102(b).

Liu is titled “Distributing Network Services and Resources in a Mobile Communications Network” and is generally directed to a mobility data network architecture for accessing data. Ex. 1003, Abstract. Liu uses a mobile floating agent protocol to dynamically provide service and resource mobility in mobile wireless Local Area Networks and cellular networks. *Id.* at 1:50–60. Liu describes that “[b]y combining Mobile-Floating agent functions with a method of predictive mobility management, the services and user data can be pre-connected and pre-assigned at the locations or cells to which the user is moving,” which “allows the users to immediately receive service and maintain their data structures with virtually the same efficiency as they could have at the previous location.” *Id.* at 2:4–10. Liu’s mobile floating agent pre-assignment protocol is depicted in Figure 6, which is reproduced below:

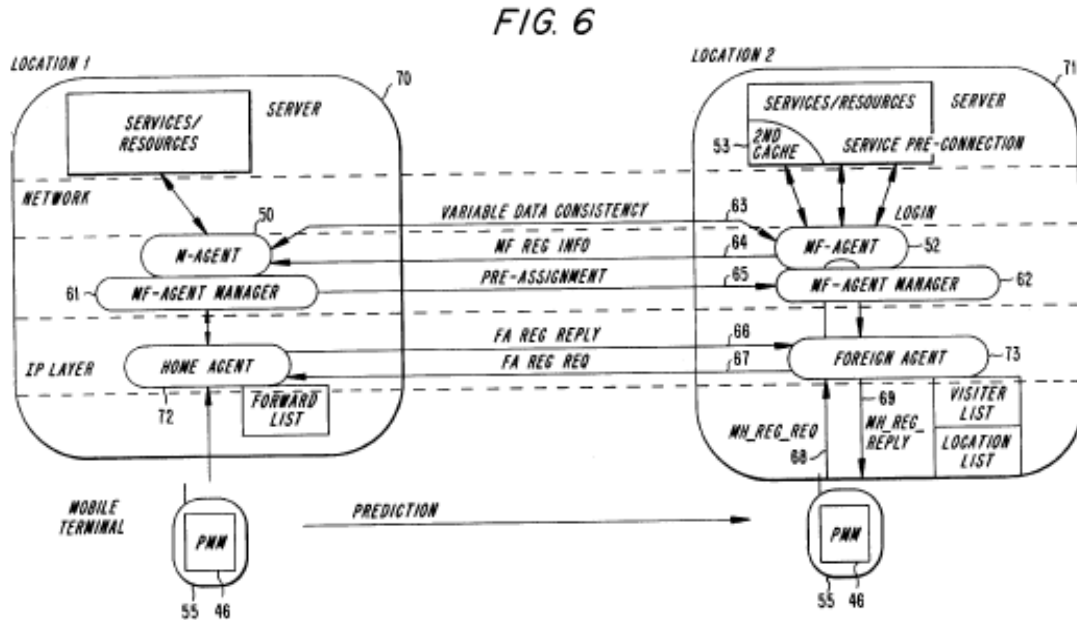


Figure 6 depicts an embodiment of the MF-agent pre-assignment protocol. *Id.* at 7:19–20. Liu describes the use of mobility agents (M-agents) and mobile-Floating Agents (MF-agents). *See e.g., id.* at 2:12–34. M-agent 50 is representative of the user and “is preferably a software entity executing on a home fixed host or router, including a set of processes that communicates with and pre-assigns an MF-agent 52 to remote fixed hosts or routers on behalf of a mobile terminal 55.” *Id.* at 6:57–61, 7:22. MF-agent 52 “is preferably a software entity executing on a remote fixed host or mobile support router (MSR), including a set of processes that can communicate and connect with the local host or MSR resources.” *Id.* at 6:61–65. Liu describes that the M-agent and MF-agent are not bound to the underlying network, and are, therefore, free to follow the mobile users. *Id.* at 7:2–5. The MF-agent pre-connects services by using predictive mobility management (PMM) to predict where a user will be. *Id.* at 7:5–9.

Mobile terminal 55 sends an MF-agent assignment request to its M-agent 50, with an address of a new location it is traveling to. *Id.* at 7:26–28. The new location may have been explicitly provided by the user or it may be predicted through PMM. *Id.* at 7:29–31. The assignment request is a request to establish (i.e., pre-assign) an MF-agent 52 at the location mobile terminal 55 is traveling to, so that the necessary services and data are ready for the mobile terminal when it arrives at the new location. *Id.* at 7:32–37. M-agent 50 registers the request and forwards it to remote MF-agent manager 62 at the new location. *Id.* at 7:37–38. Upon receiving the request, MF-agent manager 62 assigns or creates an MF-agent 52 for requesting M-agent 50. *Id.* at 7:38–50. MF-agent 52 registers itself with Foreign Agent 73 (F-agent) and sends an MF-assignment reply back to M-agent 50 containing the registration information. *Id.* at 7:50–56. M-agent 50 then sends a reply back to mobile terminal 55 and maintains a data consistency link 63 with MF-agent 52. *Id.* at 7:55–57.

When mobile terminal 55 reaches the new location, it registers with MF-agent 52 by sending an MF-agent registration request 68 to F-agent 73 to begin the registration process. *Id.* at 8:7–12. F-agent 73 will then link mobile terminal 55 to MF-agent 52. *Id.* at 8:15–16. In some embodiments, MF-agent 52 may then perform as an acting M-agent (AM-agent) for mobile terminal 55, performing the same function as an M-agent at the new location. *Id.* at 8:17–20. Accordingly, through the use of MF-agent 52, an MF-agent is waiting with the needed data and services when the user arrives at a remote location. *Id.* at 8:43–47.

2. *Gwon (Ex. 1004)*

Petitioner contends Gwon was filed on January 26, 2001 and published on September 19, 2002, and, therefore, is prior art under (pre-AIA) 35 U.S.C. §§ 102(a) and (e). Pet. 11. Patent Owner does not dispute these contentions. Based on the present record, we agree Gwon is prior art under 35 U.S.C. §§ 102(a) and (e).

Gwon is titled “Mobility Prediction in Wireless Mobile Access Digital Networks” and generally describes methods for predicting the mobility of mobile nodes. Ex. 1004, Abstract. Gwon describes determining in advance when a network connection hand-off is imminent so that a mobile node can pre-establish a new network connection with a new router or agent. *Id.* ¶ 55. Gwon uses mobility prediction analysis in mobile nodes so that the mobile node can select from among multiple available network connection nodes. *Id.* ¶¶ 55–59. As a mobile node moves locations, Gwon describes the use of Neighbor Discovery methodology, where the mobile node may receive Neighbor Advertisement messages from its local router and/or unsolicited Router Advertisement messages from its local router. *Id.* ¶¶ 51, 53. These messages “indicate[] the presence of other local routers which could provide network connections for the mobile node.” *Id.* ¶ 51.

3. *Lau (Ex. 1005)*

Petitioner contends Lau was filed on February 4, 2003 and published on May 19, 2009, and, therefore, is prior art under (pre-AIA) 35 U.S.C. § 102(e). Pet. 39. Patent Owner does not dispute these contentions. Based on the present record, we agree Lau is prior art under 35 U.S.C. § 102(e).

Lau is titled “Methods and Devices for Enabling a Mobile Network Device to Select a Foreign Agent” and is generally directed to enabling a mobile device to select a foreign agent from among a plurality of foreign agents that are transmitting position information. Ex. 1005, Abstract, 4:29–42. This position information may include GPS data. *Id.* at 3:28–31.

4. *IETF RFC 2402 (“IETF”) (Ex. 1008)*

Petitioner contends IETF was published in November 1998 and is incorporated by reference in its entirety in Gwon. Pet. 47 (citing Gwon ¶ 54). Patent Owner does not dispute that IETF is prior art. Based on the present record, and for purposes of this Decision, we agree IETF is prior art under 35 U.S.C. § 102(b). IETF is a request for comments memorandum regarding Internet standards track protocol for “IP Authentication Header.” IETF 1. Specifically, IETF primarily describes IP Authentication Header formatting and processing, as well as authentication and security measures. IETF Sections 1–3.

C. *Ground 1 (Based on Liu and Gwon)*

Petitioner contends claims 1, 5, and 6 would have been obvious over the combination of Liu and Gwon. Pet. 12–37.

1. *Claim 1*

- a. “A system for communicating between a mobile node and a communication network; the network having at least one communications network node that is interconnected using a proxy mobile internet protocol (IP), comprising:”

Petitioner relies on Liu to teach or suggest the preamble of independent claim 1. Pet. 12–14. For example, Petitioner refers to Liu’s mobile floating (MF)-agent protocol, which accommodates the “mobile nature” of mobile users by offering service and resource mobility through intelligent service pre-connection, resource pre-allocation, and data structure pre-arrangement. *Id.* at 12–13 (citing Ex. 1003, 1:58–2:2). Petitioner further relies on Liu’s disclosure of proxy entities (e.g., M-agent and MF-agent) to facilitate communications between mobile nodes and networks employing Mobile IP. *Id.* at 13–14 (citing Ex. 1003, 2:11–34, 7:15–17).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests the preamble.

b. “*at least one mobile node;*”

Petitioner contends Liu’s mobile terminal 55 teaches “at least one mobile node.” Pet. 14–15 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s mobile terminals may include cellular phones and laptop computers, and are capable of mobile communications. *Id.* at 15 (citing Ex. 1003, 17:47–48, 6:4–7).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has

adequately shown Liu teaches or suggests this limitation.

c. “at least one home agent;”

Petitioner contends Liu’s home agent 72 teaches “at least one home agent.” Pet. 14–15 (citing Ex. 1003, Fig. 6). Petitioner further asserts Liu’s home agent may be a “home fixed host or router.” *Id.* at. 15 (citing Ex. 1003, 2:15–21).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

d. “at least one foreign agent;”

Petitioner contends Liu’s F-agent 73 teaches “at least one foreign agent.” Pet. 17–18 (citing Ex. 1003, Fig. 6, 7:50–56).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

e. “a ghost-foreign agent that advertises messages to one of the mobile nodes indicating presence of the ghost-foreign agent on behalf of one of the foreign agents when the mobile node is located in a geographical area where the foreign agent is not physically present; and”

Petitioner contends Liu, or alternatively, Liu and Gwon teach or suggest this limitation. Pet. 18–26. Petitioner contends Liu’s MF-agent 52 teaches the “ghost-foreign agent.” *Id.* at 18–19 (citing Ex. 1003, Fig. 6, 8:7–34, 6:53–65). Petitioner further relies on Liu’s “MF-agent pre-assignment” protocol to teach the remainder of the limitation, and contends the MF-

assignment reply back from the MF-agent to the M-agent teaches the “advertises messages” portion of the limitation. *Id.* at 19–20 (citing Ex. 1003, 7:19–31, 7:37–46, 7:51–57). Alternatively, Petitioner contends that to the extent that the claimed advertisement message must be unsolicited, Gwon teaches unsolicited advertisements from a router (i.e. a foreign agent) via its Neighbor Discovery methodology. *Id.* at 20–22 (citing Ex. 1004 ¶¶ 50–54, 58). Petitioner also contends both Liu and Gwon teach such advertising when the mobile node is located in a geographical area where the foreign agent is not physically present. *Id.* at 24–26 (citing Ex. 1003, 7:24–37; Ex. 1004 ¶¶ 52–53, Fig. 2).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation.

f. “a ghost-mobile node that creates replica IP messages on behalf of a mobile node,”

Petitioner contends one of ordinary skill in the art would understand a “replica IP message” to “at least include a reproduction of an original IP message.” Pet. 27 (citing Ex. 1006 ¶ 80, Ex. 1001, 10:1–6). Petitioner relies on Liu to teach or suggest this limitation. *Id.* at 27–29. Petitioner contends Liu’s M-agent 50 teaches the “ghost-mobile node.” *Id.* at 27 (citing Ex. 1003, Fig. 6). Petitioner asserts that in Liu, the request to create or assign an MF-agent at a predicted location is initiated by the mobile terminal and sent to the M-agent. *Id.* at 28 (citing Ex. 1003, 7:22–38). Petitioner contends the M-agent then “forwards” the request to the remote MF-agent manager at the predicted location. *Id.* at 28 (citing Ex. 1003, 7:22–38). According to

Petitioner, one of ordinary skill in the art would understand this forwarding request to a remote location on a different network teaches “*creat[ing] replica IP messages on behalf of the mobile node*” because this “forwarding process results in a reproduction of the original message request.” Pet. 28–29 (citing Ex. 1006 ¶ 83).

Patent Owner contends Petitioner does not “explain *why* such forwarded requests would be *IP messages*.” Prelim Resp. 7. Referring to Figure 6 of Liu, Patent Owner argues request 65 is sent outside of the IP layer. *Id.* at 10.

At this stage of the proceeding, we do not find Patent Owner’s argument persuasive. Similar to the ’417 patent, Liu explicitly discusses Mobile IP protocol. *See, e.g.* Ex. 1003, 1:28, 5:55–60; Ex. 1001, 1:44–56. Petitioner’s declarant, Dr. Haas describes the Mobile IP protocol (Ex. 1006 ¶¶ 25–36) and, more specifically, states that Mobile IP encapsulation, such as described in Liu, teaches the recited “creating replica IP messages” (*id.* ¶ 83). For purposes of this Decision, we find this explanation to sufficiently support Petitioner’s contention. With respect to Patent Owner’s arguments about Figure 6, it is unclear from the Figure whether the dotted lines are meant to delineate between different layers, given that only a network and IP layer are identified. Therefore, for purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

- g. *“the ghost-mobile node handling signaling required to allocate resources and initiate mobility on behalf of the mobile node, the ghost-mobile node triggering signals based on a predicted physical location of such mobile node or distance with relation to the at least one foreign agent.”*

Petitioner asserts Liu, or alternatively, Liu and Gwon, teaches or suggests this limitation. Pet. 30–34. Petitioner contends a person of ordinary skill in the art would have understood “handling signaling required to allocate resources and initiate mobility” to include “preemptive setup and initiation of the mobility process.” *Id.* at 30 (citing Ex. 1006 ¶ 84). Petitioner relies on Liu’s M-agent’s (ghost-mobile node) pre-assignment signaling that allows for “services and/or data [to] be pre-connected/pre-arranged at the mobile user’s destination.” *Id.* at 31 (citing Ex. 1003, 2:29–35, Fig. 5). Petitioner further refers to the M-agent sending the pre-assignment signaling based on the use of PMM, including the predicted physical location of the terminal, to trigger service and resource pre-arrangement. *Id.* at 31–33 (citing Ex. 1003, 7:22–38, 19:4–14). Alternatively, Petitioner argues Gwon teaches a mobility prediction analysis. *Id.* at 33 (citing Ex. 1004 ¶¶ 57, 59–104).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation.

2. *Rationale for Combining Liu and Gwon*

Petitioner contends a person of ordinary skill in the art would have been motivated to modify Liu’s MF-agent to proactively broadcast its

presence to the mobile node since it is “simply applying a known technique to a known device ready for improvement to yield predictable results.” Pet. 23 (citing Ex. 1006 ¶¶ 77–78). Petitioner asserts proactive broadcasts were well known and would have (1) “facilitated the pre-assignment of a mobile device before it reached the foreign network, decreasing the time required to complete a handover with a foreign agent at a new network to which the mobile device was travelling” and (2) “decreased the computational burden on the mobile device by removing the need to request the assignment of a MF-agent, shifting this burden to the MF-agent on a router in the foreign network.” *Id.* at 23 (citing Ex. 1006 ¶¶ 77–78). Therefore, Petitioner contends combining Gwon’s known Neighbor Discovery protocol with the MF-agent pre-assignment protocol of Liu “comports with the actual historical evolution of the technology at the time, which resulted in a more efficient and simplistic method to pre-allocate resources,” and therefore, would have been obvious to one of skill in the art. *Id.* at 24–26 (citing Ex. 1006 ¶¶ 77–79).

In addition, Petitioner contends one of skill in the art would have been motivated to substitute Gwon’s mobility prediction analysis into Liu, because it is merely substituting one known element for another. Pet. 34 (citing Ex. 1006 ¶ 87). Petitioner asserts a person of ordinary skill in the art “would have understood that any available method of determining an accurate predicted location would have been a suitable and obvious variation.” *Id.* (citing Ex. 1006 ¶ 87).

Patent Owner does not dispute Petitioner’s analysis. For purposes of this Decision, we determine Petitioner has provided evidence as well as “articulated reasoning with some rational underpinnings” in support of its

obviousness contentions. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2008). For the foregoing reasons, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 1 as unpatentable over Liu and Gwon.

3. *Claim 5*

Dependent claim 5 depends from claim 1 and further recites “wherein allocation of resources on behalf of the mobile node is triggered based at least in part on location information, the location information determined by at least one of: a global positioning system (GPS) receiver, a triangulation process, and indirect measurements of location.” Ex. 1001, 13:21–26.

Petitioner relies on Liu, or alternatively, Liu and Gwon, to teach or suggest the limitations in dependent claim 5. Pet. 34–36. Petitioner contends Liu teaches indirect measurements of location in that it measures the user’s historical movement patterns to predict a new location. *Id.* at 34 (citing Ex. 1006 ¶ 89). Alternatively, Petitioner contends Gwon teaches providing location information by a triangulation process and/or a global positioning system. *Id.* at 35 (citing Ex. 1004 ¶ 76). Petitioner contends it would have been obvious to one of skill in the art “to substitute one location determination method for another, as this is substituting one known element for another to obtain predictable results.” *Id.* at 36.

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, alone or in combination with Gwon, teaches or suggests this limitation. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 5 as

unpatentable over Liu and Gwon.

4. *Claim 6*

Dependent claim 6 depends from claim 1 and further recites “wherein the at least one ghost-foreign agent populates mobile IP Advertisement messages with at least one care-of-address of neighboring foreign agents in order to extend the range of neighboring foreign agents.” Ex. 1001, 13:27–31.

Petitioner relies on Gwon to teach that an advertisement message may also include the care-of address of neighboring foreign agents. Pet. 36 (citing Ex. 1004 ¶ 51). Petitioner asserts one of ordinary skill in the art “would have recognized that Gwon’s disclosure of a Router Advertisement message that indicates the presence of other local routers would contain the IP address of those other local routers (i.e. their care-of-address in the network) to indicate their presence.” *Id.* at 37 (citing Ex. 1006 ¶ 91).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. However, based on our review of the Petition, Gwon describes providing a new care-of IP address to the mobile node’s home router as part of the registration process (after the new local router has been identified), but does not disclose populating the advertisement message with care-of addresses of at least one neighboring foreign agent (during the router identification process). Ex. 1004 ¶ 54; *see also* Ex. 1006 ¶ 52.

Based on the record before us, we are not persuaded that the evidence presented in the Petition shows a reasonable likelihood that Petitioner would prevail in showing that claim 6 is unpatentable over Liu and Gwon.

D. Ground 2 (Based on Liu, Gwon, and Lau)

Petitioner contends claims 2 and 3 would have been obvious over the combination of Liu, Gwon, and Lau. Pet. 37–45.

1. Claim 2

Dependent claim 2 depends from claim 1 and further recites “wherein signaling further comprises registration with a replica of the mobile node by the ghost-mobile node to communicate with the foreign agents, triggering tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” Ex. 1001, 13:1–5.

Petitioner relies on Liu and Lau to teach or suggest the limitations in claim 2. Pet. 38–42. Specifically, Petitioner refers to Liu’s AM-agent as teaching the “replica of the mobile node” and Liu’s M-agent as teaching the “mobile node,” and asserts the M-agent registers and maintains a data consistency link with the AM-agent to communicate with a foreign agent. *Id.* at 38–39 (citing Ex. 1003, 2:6–10, 2:44–53, 8:7–34; Ex. 1006 ¶ 93). Petitioner relies on Lau to teach or suggest “tunneling and communication with a mechanism configured to maintain routing information to a mobile node.” *Id.* at 40–41 (citing Ex. 1005, 2:48–59). Specifically, Petitioner refers to Lau’s teaching a packet forwarding mechanism implemented by the Home and Foreign Agents that is referred to as “tunneling.” *Id.* at 41 (citing Ex. 1005, 2:48–59).

Petitioner contends one of ordinary skill in the art would have been motivated to combine the M-agent registration signaling of Liu with the well-known technique of Lau for tunneling because it is “applying a known technique to a known device ready for improvement to yield predictable results.” Pet. 41 (citing Ex. 1006 ¶ 94). Petitioner asserts tunneling was

commonplace in mobile networks and provided many benefits that would have been well known to a person of ordinary skill in the art, such as providing a secure channel between two disjoint IP networks and allowing for circumvention of traditional routing limitations. *Id.* at 41–42 (citing Ex. 1006 ¶ 94).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu and Lau teach or suggest this limitation and has provided sufficient evidence and “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 2 as unpatentable over Liu, Gwon, and Lau.

2. *Claim 3*

Dependent claim 3 depends from claim 1 and further recites “wherein signaling further comprises at least one of a tunnel and a communication network to allocate resources between the mobile node and foreign agent, the signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance reported to one of the foreign agents at least one of a projected trajectory and a speed.” Ex. 1001, 13:6–12.

Petitioner contends Liu, Lau, and Gwon teach or suggest the limitations in claim 3. Pet. 43–45. In addition to arguments made with respect to claim 2, Petitioner further argues Gwon teaches the recited “signaling being triggered at a threshold distance to one of the foreign agents reported by one of the mobile nodes, the threshold distance reported to one

of the foreign agents at least one of a projected trajectory and a speed.” *Id.* at 43. Specifically, Petitioner contends “Gwon teaches a mobility prediction analysis that provides a threshold value indicating a distance from a mobile node to a node in the network, which informs the mobile node to begin signaling to establish a new network connection.” *Id.* at 43 (citing Ex. 1004 ¶ 57). Petitioner further contends Gwon “teaches the use of GPS information to provide the threshold value indicating how close the mobile node is to another node in the network.” *Id.* at 44 (citing Ex. 1004 ¶ 59). Petitioner asserts one of ordinary skill in the art would have understood “information such as that provided by GPS” to include both a trajectory and a speed when calculating an estimated destination.” *Id.* at 44 (citing Ex. 1006 ¶¶ 95–96).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. However, based on our review of the Petition, we do not find Petitioner’s analysis convincing. Although Gwon describes determining a threshold value as part of the mobility prediction analysis to determine when some desired action should be taken by the mobile node (Ex. 1004 ¶ 57), Petitioner has not identified where Gwon teaches reporting the “threshold distance . . . to one of the foreign agents.”

Based on the record before us, we are not persuaded that the evidence presented in the Petition shows a reasonable likelihood that Petitioner would prevail in showing that claim 3 is unpatentable under Liu, Lau, and Gwon.

E. Ground 3 (Based on Liu, Gwon, and IETF)

Petitioner contends claim 4 would have been obvious over the combination of Liu, Gwon, and IETF. Pet. 45–49.

Dependent claim 4 depends from claim 1 and further recites “wherein the at least one ghost-mobile node is a proxy element for the at least one foreign agent and the at least one mobile node, the at least one ghost-mobile node triggering registration based on a distance to a foreign agent by relaying security and shared secrets from a mobile node, and at least one advertisement message from a foreign agent in a vicinity of the ghost-mobile node.” Ex. 1001, 13:13–20.

Petitioner relies on Liu, Gwon, and IETF to teach or suggest the limitations in claim 4. Pet. 45–49. Petitioner asserts Liu’s M-agent is a proxy element between a mobile terminal and a foreign agent, and functions as a proxy for both the mobile node and the foreign agent. *Id.* at 45 (citing Ex. 1006 ¶ 98). Petitioner also asserts Gwon teaches triggering registration using security information and authentication data based on a distance to a foreign agent. *Id.* at 46 (citing Ex. 1004 ¶ 57). Petitioner further contends IETF discloses the use of MD5 authentication algorithms and security protocols during registration of the mobile node, to provide security and confidentiality services between a mobile node connecting with a foreign agent. *Id.* at 47 (citing Ex. 1008 §§ 1, 3). Petitioner further contends Liu teaches an advertisement message, as discussed above, and Gwon teaches a distance based triggering mechanism for foreign agent advertisements. *Id.* at 48 (citing Ex. 1004 ¶ 57; Ex. 1006 ¶ 98).

With respect to the combination, Petitioner contends a person of ordinary skill in the art would have found it obvious to combine Liu’s pre-registration signaling and foreign agent advertising with Gwon’s triggering mechanism for these processes. *Id.* at 48 (citing Ex. 1006 ¶¶ 99–100). Petitioner asserts such a modification to Liu “would eliminate the need for a

mobile device to use solicitation processing abilities or location prediction methods for registration, thereby increasing the processing speed of the mobile device and decreasing the overall computational complexity of the system.” *Id.* at 48 (citing Ex. 1006 ¶¶ 99–100). Petitioner argues adding IETF would be similarly obvious because Gwon provides an explicit motivation for the combination by incorporating the reference in its own disclosure. *Id.* at 49 (citing Ex. 1006 ¶¶ 99–100). Petitioner also contends implementing software algorithms for security protocols would have been commonplace for preregistration and would have added negligible complexity to the system.” *Id.* at 49 (citing Ex. 1006 ¶¶ 99–100).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu, Gwon, and IETF teaches or suggests this limitation and has provided sufficient evidence and “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Therefore, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 4 as unpatentable over Liu, Gwon, and IETF.

F. Ground 4 (Based on Liu and Lau)

Petitioner contends claim 7 would have been obvious over the combination of Liu and Lau. Pet. 49–56.

1. Claim 7

- a. “A method, in a mobile node, for speeding handover, comprising the steps of:”*

Petitioner relies on Liu to teach or suggest the preamble of

independent claim 7. Pet. 49–50. For example, Petitioner relies on Liu’s Mobile-Floating agent functions, which “allow[] the users to **immediately receive service** and maintain their data structures with virtually the same efficiency as they could have at the previous location. It also provides ‘soft data structure handoff’ capability.” *Id.* at 49–50 (citing Ex. 1003, 2:3–10 (emphasis omitted)).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests the preamble.

b. “updating, in a mobile node, a location in a ghost mobile node;”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 49–50. Specifically, Petitioner argues “Liu discloses a mobile terminal (‘mobile node’) that updates an M-agent (‘ghost-mobile node’) with respect to its future travel and the M-agent then determines the closest foreign agent to that future predicted location.” *Id.* at 50–51 (citing Ex. 1003, 7:26–32). Petitioner further relies on Lau, which “discloses a mobile device (mobile node) that maintains its own current location information to calculate a distance between itself and approaching foreign agents.” *Id.* at 51 (citing Ex. 1005, 4:29–41).

Patent Owner argues “the claim requires updating the mobile node with a location in a ghost mobile node.” Prelim. Resp. 12. Patent Owner asserts Petitioner “directs its arguments to teachings concerning updating an M-agent (an alleged ‘ghost-mobile node’) with respect to future travel of a

mobile terminal (or ‘mobile node’) [which is] the reverse of what is claimed.” *Id.* At this stage of the proceeding, we disagree.

Patent Owner’s argument is based on a claim construction: whether the mobile node itself must be updated with the location in a ghost mobile node. Patent Owner, however, does not direct our attention to any portion of the ’417 patent that supports its interpretation of this limitation. Rather, the ’417 patent indicates that the ghost mobile node acts according to a predicted future state, such as location, of the mobile node. *E.g.*, Ex. 1001, 2:58–65, 6:27–30, 6:39–42, 6:46–56, 6:65–67, 7:4–7). The claim language recites “updating, in a mobile node, a location in a ghost mobile node,” which, for purposes of this decision, we understand to mean that the mobile node updates the ghost mobile node with its location. *See id.* At this stage of the proceeding, and in light of our review of the ’417 patent, Petitioner has identified support Liu discloses a mobile terminal that updates the ghost mobile node (i.e., “an M-agent”) with its location. Accordingly, for purposes of institution, Petitioner has adequately shown Liu and Lau teach or suggest this limitation.

- c. *“determining a distance, in the ghost mobile node in communication with the mobile node, to a closest foreign agent with which the mobile node can complete a handover;”*

Petitioner relies on Liu and Lau to teach or suggest this limitation. Pet. 52–53. For example, Petitioner argues “Liu teaches a system where the M-agent (‘ghost-mobile node’) uses the predicted location of the mobile terminal in conjunction with an MF-agent protocol to assign the closest MF-agents with which the mobile device may complete a handover.” *Id.* at 52

(citing Ex. 1004, 12:52–66). Petitioner also asserts “Lau allows for the mobile network device to utilize its own location information in conjunction with GPS information sent from foreign agents to calculate the distance to the closest foreign agent.” *Id.* at 53 (citing Ex. 1005, 3:43–57).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu and Lau teach or suggest this limitation.

d. “submitting on behalf of the mobile node, from the ghost mobile node, a registration to the foreign agent to which the mobile node is going to complete the handover; and”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 54. For example, Petitioner argues Liu’s “M-agent (‘ghost-mobile node’) submits registration request on behalf of the mobile terminal (‘mobile node’) to register with a foreign agent where handoff is to occur.” *Id.*

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

e. “upon completing the handover, updating a registration in the mobile node.”

Petitioner relies on Liu to teach or suggest this limitation. Pet. 55. For example, Petitioner argues “[i]n Liu, a registration reply is sent to the mobile terminal from the MF-agent linked to a foreign agent.” *Id.* (citing Ex. 1003, 7:51–57). Petitioner further argues “once the mobile terminal reaches its destination, it links with the MF-agent that has been assigned there and registers with the foreign agent to complete the registration

process.” *Id.* at 55 (citing Ex. 1003, 8:7–16). Petitioner contends a person of ordinary skill in the art “would have understood that this link also completes the updating of the registration with the new F-agent and linked MF-agent in the mobile node.” *Id.* at 56 (citing Ex. 1006 ¶ 105; Ex. 1003, 8:7–16, Fig. 8).

At this stage of the proceeding, Patent Owner does not dispute Petitioner’s analysis. For purposes of institution, we find that Petitioner has adequately shown Liu teaches or suggests this limitation.

2. Rationale for Combining Liu and Lau

Petitioner contends one of ordinary skill in the art “would have been motivated to modify the mobile node in Liu to send current location information to the M-agent as it travels as disclosed in Lau, to supplement the predictive mobility analysis.” Pet. 51 (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts “[t]his is merely using a known technique to improve a similar device in the same way and/or combining prior art methods according to known methods to yield predictable results.” *Id.* (citing Ex. 1006 ¶¶ 102–103). Petitioner further argues one of ordinary skill in the art would have understood the benefits of sending current location data, such as, for example, creating a more efficient system for locating the closest handoff point in the foreign network. *Id.* at 51–52 (citing Ex. 1006 ¶¶ 102–103).

Petitioner further contends one of ordinary skill in the art would have been motivated to modify Liu “with the method in Lau for measuring the position of a mobile device in relation to the position of the foreign agents in the network to calculate the nearest foreign agent since this is combining prior art methods according to known methods to yield predictable results.”

Id. at 54 (citing Ex. 1006 ¶¶ 102–103). Petitioner asserts this “would have provided a more accurate method of finding the shortest distance to the next closest handoff point” and “would also have provided a faster system for finding the next handover location when the mobile device deviates from its original course.” *Id.* at 54 (citing Ex. 1006 ¶¶ 102–103).

For purposes of this Decision, we determine Petitioner has provided evidence as well as “articulated reasoning with some rational underpinnings” in support of its obviousness contentions. Patent Owner has not disputed Petitioner’s analysis. Therefore, at this stage of the proceeding, we determine Petitioner has established a reasonable likelihood of prevailing on its challenge to claim 7 as unpatentable over Liu and Lau.

G. Conclusion

For the foregoing reasons, we determine Petitioner has demonstrated a reasonable likelihood that it would prevail in establishing the unpatentability of claims 1, 2, 4, 5, and 7 of the ’417 patent based on the grounds asserted in the Petition. Petitioner has not, however, shown on the current record a reasonable likelihood that it would prevail in establishing the unpatentability of claims 3 and 6 of the ’417 patent. We nevertheless institute an *inter partes* review of all challenged claims on all of the grounds set forth in the Petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim. Any findings of fact and conclusions of law made herein are not final, but are made for the sole purpose of determining whether Petitioner meets the threshold for

initiating review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an inter partes review is hereby instituted as to claims 1–7 of the '417 patent on the following asserted grounds:

Claims 1, 5, and 6 under 35 U.S.C. § 103(a) as obvious over the combination of Liu and Gwon;

Claims 2 and 3 under 35 U.S.C. § 103(a) as obvious over the combination of Liu, Gwon, and Lau;

Claim 4 under 35 U.S.C. § 103(a) as obvious over the combination of Liu, Gwon, and IETF; and

Claim 7 under 35 U.S.C. § 103(a) as obvious over the combination of Liu and Lau.

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 commencing on the entry date of this Decision.

Case IPR2018-01150

Patent 8,213,417 B2

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