

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RED HAT, INC.
Petitioner,

v.

COMPETITIVE ACCESS SYSTEMS INC.
Patent Owner

U.S. Patent No. 10,868,908
Issued: December 15, 2020
Filed: May 23, 2016
Inventor: Eric M DeLangis
Title: Devices and Methods for Multipath Communications

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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1001	Declaration of Bill Lin, Ph.D. in support of <i>Inter Partes</i> Review
1002	<i>Curriculum Vitae</i> of Bill Lin
1003	Certified Copy of U.S. Patent No. 11,582,343
1004	Certified File History of U.S. Patent No. 11,582,343
1005	Certified Copy of U.S. Patent No. 11,418,641
1006	Certified File History of U.S. Patent No. 11,418,641
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1008	Certified File History of U.S. Patent No. 10,868,908
1009	Certified Copy of U.S. Patent No. 9,350,649
1010	Certified File History of U.S. Patent No. 9,350,649
1011	Certified Copy of U.S. Patent No. 8,861,349
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1013	Certified Copy of U.S. Patent No. 8,228,801
1014	Certified File History of U.S. Patent No. 8,228,801
1015	Certified Copy of U.S. Patent No. 7,606,156
1016	Certified File History of U.S. Patent No. 7,606,156
1017	U.S. Patent Application Publication No. 2004/0001512 A1 (“Challener”)
1018	U.S. Patent Application Publication No. 2003/0026221 A1 (“Kotzin”)
1019	James Carlson, <i>PPP Design, Implementation, and Debugging</i> (2d ed. 2000) (“Carlson”)
1020	Gilbert Held, <i>Network Design Principles and Applications</i> , 2000 (“Held”)

¹ Unless otherwise specified, citations are to the original page, column, and line numbers in exhibits rather than the PDF page. Citations corresponding to the PDF pagination are indicated in [[brackets]]. Unless otherwise noted, all emphases and annotations are added.

Exhibit No.	Description
1021	U.S. Patent No. 6,917,960 (“Decasper”)
1022	Johnny Chen, <i>New Approaches to Routing for Large-Scale Data Networks</i> (Rice University, 1999) (“Chen”)
1023	Declaration of Sylvia Hall-Ellis
1024	Webster's Ninth New Collegiate Dictionary, 1990
1025	Xin, W., Ishihara, S., and Mizuno, T., <i>A QoS-ensured Transmission Scheme with Content-based Priority for Mobile Cluster Users</i> , 2000 (“Xin”)
1026	U.S. Patent Application Publication No. 2002/0042274 A1 (“Ades”)
1027	U.S. Patent No. 7,003,580 (“Cook”)
1028	U.S. Patent No. 5,625,877 (“Dunn”)
1029	U.S. Patent Application Publication No. 2002/010866 A1 (“McCullough”)
1030	Candace Leiden & Marshall Wilensky, <i>TCP-IP for Dummies</i> (3d ed. 1999) (“Dummies”)
1031	U.S. Patent Application Publication No. 2003/0223450 A1 (“Bender”)
1032	U.S. Patent Application Publication No. 2004/0022224 A1 (“Billhartz”)
1033	Hung-Yun Hsieh & Raghupathy Sivakumar, <i>A Transport Layer Approach for Achieving Aggregate Bandwidths on Multi-homed Mobile Hosts</i> (2002) (“Hsieh”)
1034	U.S. Patent No. 6,778,495 (“Blair”)
1035	Cisco Systems, Inc., <i>Troubleshooting Async Multilink PPP Operations</i> (2001) (“Cisco”)
1036	U.S. Patent Application Publication No. 60/377,631 (“Tucker”)
1037	Konishi et al., <i>Web SHAKE: A fast WWW access method for mobile terminals on temporary cluster networks</i> , IEEE Proceedings April 28-May 2, 2022 (“Konishi”)
1038	RFC 1990: The PPP Multilink Protocol (MP), August 1996
1039	<i>Competitive Access Systems, Inc. v. Oracle Corporation, and Oracle America, Inc.</i> , 1:23-ca-00286-ADA, Dkt. 82 (W.D.TX. Aug. 10, 2023)
1040	<i>Red Hat, Inc. v. Competitive Access Systems, Inc.</i> , 4:24-cv-00130-D, Dkt. 1 (E.D.N.C. Sep. 3, 2024)

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1041	<i>Red Hat, Inc. v. Competitive Access Systems, Inc.</i> , 4:24-cv-00130-D, Dkt. 1-10 (E.D.N.C. Sep. 3, 2024)
1042	Lai et al., <i>Measuring Bandwidth</i> , IEEE (1999)
1043	RFC 2663: IP Network Address Translator (NAT) Terminology and Considerations, August 1999
1044	U.S. Patent No. 5,878,040 (“Peirce”)
1045	“A Novel Mechanism for Data Streaming Across Multiple IP Links for Improving Throughput and Reliability in Mobile Environments,” IEEE INFOCOM 2002 (“Phatak”)
1046	RFC 2543: SIP: Session Initiation Protocol, March 1999
1047	RFC 2131: Dynamic Host Configuration Protocol, March 1997
1048	RFC 1945: Hypertext Transfer Protocol – HTTP/1.0, May 1996
1049	Endler, David, <i>Brute-Force Exploitation of Web Application Session IDs</i> , iALERT White Paper, Nov. 1, 2001 (“Endler”)
1050	Rappaport, Theodore S., et al., <i>Wireless Communications and Application Above 100 GHz: Opportunities and Challenges for 6G and Beyond</i> , IEEE Access, Vol. 7, 2019 (“Rappaport”)
1051	Reex. Control No. 90/019,265
1052	Gast, Matthew S., <i>802.11 Wireless Networks – The Definitive Guide</i> , 2002
1053	Shoemake, Matthew B., <i>Wi-Fi (IEEE 802.11b) and Bluetooth CoExistence Issues and Solutions for the 2.4 GHz ISM Band</i> , Texas Instruments, Feb. 2001, Ver. 1.1
1054	Furuskär, Anders, et al., <i>EDGE: Enhanced Data Rates for GSM and TDMA/136 Evolution</i> , IEEE Personal Communications, June 1990
1055	RFC 2326: Real Time Streaming Protocol (RTSP), April 1998
1056	Random House Webster’s Computer & Internet Dictionary, 3 rd ed., December 1998
1057	Andrew S. Tanenbaum, <i>Computer Networks</i> (3d ed. 1996)
1058	Adolfo Rodriguez <i>et al.</i> , <i>TCP/IP Tutorial and Technical Overview</i> , Chps. 1 & 14 (Prentice Hall PTR 2002)
1059	Richard O. LaMaire, et al., <i>Wireless LANs and Mobile Networking: Standards and Future Directions</i> , IBM, May

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Exhibit No.	Description
	31, 1996

Petitioner Red Hat, Inc. (“Red Hat”) respectfully requests *inter partes* review of claims 8-12, 17, 4, and 7 (“Challenged Claims”) of U.S. Patent No. 10,868,908 (“the ’908 patent”).

I. INTRODUCTION

The Challenged Claims of the ’908 patent are unpatentable in view of two references that were not substantively considered during its original prosecution before the Patent Office, the Kotzin and Phatak references.

The ’908 patent is directed to a device referred to by the ’908 patent as a residential communications gateway (“RCG”). The RCG connects a residence (*e.g.*, an Internet user) to a communications network (*e.g.*, the Internet via an Internet service provider or “ISP”) “over a customer’s existing POTS line, and it doesn’t require any network infrastructure build out like DSL and Cable services.” EX1007, 3:21-24. The RCG was intended “to enhance, not replace, the existing telephone line” by aggregating bandwidth over the “last mile” of copper over which almost all residential customers received their communication services in the 2002 timeframe. *Id.*, 3:21-34, 1:24-27.

Yet, as discussed below, aggregating bandwidth among devices to resolve the “last mile” or similar bandwidth issues was known in the prior art. For example, the ’908 patent acknowledges that it is merely applying RFC 1990, the PPP Multilink Protocol that was published in August 1996, to achieve a multilink

broadband connection. *Id.*, 11:25-31. The PPP Multilink Protocol teaches using link aggregation to increase bandwidth. EX1038.

Against this backdrop, this Petition, supported by the Declaration of Dr. Bill Lin, Ph.D., presents two grounds based on the Kotzin and Phatak references, which render the Challenged Claims obvious as discussed in detail below.

II. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Petitioner requests cancellation of the Challenged Claims as unpatentable under 35 U.S.C. § 103.

A. Prior Art Patents and Printed Publications

Petitioner's challenge is based on the following references, which predate the earliest claimed priority date of the '908 patent:

1. U.S. Patent Application Publication No. 2003/0026221 ("Kotzin") (EX1018), filed on August 2, 2001, published on February 6, 2003, and prior art under at least pre-AIA 35 U.S.C. § 102(e).

2. "A Novel Mechanism for Data Streaming Across Multiple IP Links for Improving Throughput and Reliability in Mobile Environments," IEEE INFOCOM 2002 ("Phatak") (EX1045), published June 2002. It has been publicly available since at least August 6, 2002, or shortly thereafter. EX1023 (Hall-Ellis Decl), ¶55. Phatak is prior art under at least pre-AIA 35 U.S.C. § 102(a).

3. U.S. Patent No. 5,878,040 (“Peirce”) (EX1044), filed on August 26, 1997, with a priority date of November 17, 1995, issued on March 2, 1999, and prior art under at least pre-AIA 35 U.S.C. § 102(b).

3. NETWORK DESIGN PRINCIPLES AND APPLICATIONS (“Held”) (EX1020), a textbook published by Auerbach Publications in 2000 and edited by Gilbert Held. It has been publicly available since at least June 14, 2000. EX1023 (Hall-Ellis Decl), ¶48. Held is prior art under at least pre-AIA 35 U.S.C. §102(b).

4. U.S. Patent No. 6,917,960 (“Decasper”) (EX1021), issued on May 7, 2005, filed on September 13, 2000, and prior art at least under pre-AIA 35 U.S.C. § 102(e).

B. Relief Requested

The specific grounds of the challenge are set forth below and supported by the declaration of Bill Lin, Ph.D.

Ground	Claims	Proposed Statutory Rejection
IA	8-12, 17, 4, 7	Obvious in view of Kotzin under §103
IB	8-12, 17, 4, 7	Obvious in view of Kotzin in combination with Held, Peirce and Decasper under §103
II	8-12, 17, 4, 7	Obvious in view of Phatak under §103
IIB	8-12, 17, 4, 7	Obvious in view of Phatak in combination with Held under §103

III. TECHNOLOGY OVERVIEW

A. Bandwidth Aggregation

Before the alleged invention of the '908 Patent, it was well-known that devices like gateways could aggregate bandwidth. It was well-known that gateways extend the connectivity of a network and help achieve greater bandwidth without additional remote hardware or changes to the existing physical infrastructure. Ex. 1017, ¶¶ [0014], [0016], Fig. 3, Ex. 1028, 6:35-40, Ex. 1029, Abstract, ¶¶ [0002], [0085]; Ex. 1020 at 256. Algorithms were also developed to effectively aggregate, or “bundle,” multiple connections between source and destination. For example, Multipath TCP protocol was well known prior to the '343 patent's earliest priority date. For instance, the TCP/IP protocol on which Multipath TCP is based was created in the 1980s. *See* EX1030, 100-12; EX1020, 142, 281-82; EX1022, 8, 119, 124, 143-44; EX1033. And Multipath TCP was proposed as early as 1999. EX1022, 8. Multipath TCP uses two or more paths between a server and client to transmit packets between them, instead of the single path used in traditional TCP. *Id.*, Chapter 7. Additionally, TCP was recognized as helpful to provide flow control and congestion control. EX1020, 243–44. TCP was also known to employ a tuple (including source address/port and destination address/port) in order to uniquely identify a particular communication session. Ex. 1043 at §2.3.

B. Bandwidth Aggregation as a Solution to the Last Mile Problem

In the late 1990s and early 2000s, the “last mile” problem—referring to the final segment of the telecommunications network connecting homes to service providers, typically via low-bandwidth copper wires—was widely recognized as a major bottleneck in residential networking, as most users were limited to Plain Old Telephone Service (POTS) lines despite the availability of high-capacity core infrastructure like fiber optics (see EX1017, ¶[0004]). To address this, solutions emerged that leveraged existing infrastructure with low-cost enhancements rather than costly upgrades. For example, Challenger describes a bandwidth sharing device that allows an end user to aggregate bandwidth from multiple other devices, increasing effective bandwidth without modifying the physical network. *See id.*, ¶[0040]. Similarly, Cook acknowledged the limitations of single communication paths to the client’s interface and proposed supplementing wireline connections with wireless links, enabling parallel data transmission and higher aggregate bandwidth without the need for additional wireline installations. *See Id.*, 1:29-33,50-56.

IV. THE ’908 PATENT

The ’908 patent is entitled “Devices and Methods for Multipath Communications” and was issued from U.S. Patent Application No. 15/161,787. The ’908 patent is a continuation of U.S. Patent No. 9,350,649 (issuing from U.S.

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Patent Application No. No. 14/512,414), which is a continuation of U.S. Patent No. 8,861,349 (issuing from U.S. Patent Application No. 13/531,294), which is a continuation of U.S. Patent No. 8,228,801 (issuing from U.S. Patent Application No. 12/581,852), which is a continuation of U.S. Patent No. 7,606,156 (issuing from U.S. Patent Application No. 10/686,375), which claims priority to Provisional Application No. 60/418,521 filed on October 15, 2002. October 15, 2002 is therefore the earliest possible priority date for the '908 patent. Petitioner does not admit that the '908 patent is entitled to this or any priority and reserves the right to challenge the priority in this or other proceedings. Even if the '908 patent were entitled to an October 15, 2002 priority date, the references relied upon herein are all prior art.

A. Claims

The '908 patent has 17 claims, of which claims 8-12, 17, 4 and 7 are challenged. Claims 8 and 17 are independent claims. The claims challenged herein are listed below, in the order they appear and labeled as they appear:

Independent Claim 8.

[Preamble] A server for multilink communication with a device, the server comprising:

[8.a] at least one server network interface; and

[8.b] one or more processors coupled to the at least one server network interface and configured to:

[8.c] receive a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication and first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets;

[8.d] sending a data packet including the multilink session identification to the first network communication interface of the device;

[8.e] receive a second multilink packet over the at least one server network interface, the second multilink packet comprised of the multilink session identification and second information associated with a second network communication interface of the device that is capable of being used by the device to receive data packets; and

[8.f] send different groups of data packets over the at least one server network interface to the first network communication interface of the device and to the second network

communication interface of the device, wherein each of the different groups of data packets includes the multilink session identification.

Dependent Claim 9. The server of claim 8, wherein the one or more processors is further configured to send the multilink session identification that is unique to the data packets being sent to the first network communication interface and the second network communication interface.

Dependent Claim 10. The server of claim 8, wherein the one or more processors is further configured to:

[10.a] receive a third multilink packet, the third multilink packet is comprised of multilink information associated with a third network communication interface of the device that is capable of being used by the device to receive data packets; and

[10.b] send different groups of data packets to the first network communication interface of the device, the second network communication interface of the device and the third network communication interface of the device.

Dependent Claim 11. The server of claim 8, wherein the one or more processors is further configured to receive a multilink packets comprised of multilink information associated with which one of the first network

communication interface of the device, the second network communication interface of the device and the third network communication interface of the device is to be removed from the multilink session.

Dependent Claim 12. The server of claim 8, wherein the one or more processors is further configured to receive different multilink packets over the at least one server network interface at different periods of time.

Independent Claim 17.

[Preamble] A client device for multilink communication, the client device comprising:

[17.a] a first network interface having a first data transfer rate associated therewith;

[17.b] a second network interface having a second data transfer rate associated therewith; and

[17.c] at least one processor and configured to:

[17.d] transmit a first message through the first network interface to at least one server, wherein the first message includes a multilink request and a destination URL;

[17.e] transmit a second message through the second network interface to the at least one server, wherein the second message

includes a multilink session identification that is unique to the multilink session and the destination URL; and

[17.f] receive concurrently the different data packets from the server through the first network interface and the second network interface of the client device during the multilink session, wherein the first data transfer rate and the second data transfer rate provide an increase in the data transfer rate of the client device.

Dependent Claim 4. The client device of claim 1, wherein the first information is comprised of at least one of an Internet address associated with the first network interface, and the second information is comprised of at least one of an Internet address associated with the second network interface.

Dependent Claim 7. The client device of claim 1, wherein the client device is one of a cell phone, a tablet, a switch, a server, a network device, a router, a computer, a Wi-Fi device, a Wi-Max device, a wireless device, a mobile communication device, a near-field communications device, and a Bluetooth device.

B. Specification

The alleged problem in the art that the '908 patent set out to solve was that high-speed data services required expensive infrastructure enhancements to local telephone service lines to resolve “last mile” bandwidth issues. EX1007, 1:25, 2:11-14. The purported solution provided by the '908 patent is sharing and aggregating bandwidth from multiple RCGs and broadband communications devices such as gateways or routers, which was already known in the art using prior-art protocols such as Multilink PPP (“MLPPP”). *Id.*, 3:27-37, 11:25-28, Fig. 7. As discussed below, however, this solution for sharing and aggregating bandwidth among multiple broadband communication devices was already proposed by Kotzin and Phatak.

C. Prosecution History

The original prosecution of the '908 patent was long and complex, including nine different rejections and three requests for continued examination. The result of these rejections was that the issued claims of the '908 patent were significantly narrowed from the originally filed claims.

Following issuance, an *ex parte* reexamination request was filed against the '908 patent on October 4, 2023 against claims 1-3, 5, 6, and 13-15. EX1051 (Reex. Control No. 90/019,265). Reexamination was ordered on January 2, 2024, and non-final office action rejecting all challenged claims based on the primary Maurya

reference was issued on June 13, 2024. EX1051, [[399]]-[[426]], [[534]]-[[568]]. The Applicant provided responsive arguments in an amendment on August 13, 2024. *Id.*, [[574]]-[[596]]. A final rejection was issued on October 2, 2024. *Id.*, [[603]]-[[646]]. The Patent Owner filed its appeal brief to the PTAB on February 3, 2025 and its reply brief on May 27, 2025. *Id.*, [[768]]-[[799]], [[841]]-[[849]]. Appeal proceedings before the PTAB are pending.

This Petition does not challenge any of the claims at issue in the above-referenced reexamination proceeding, but is limited to unchallenged claims 8-12, 17, 4, and 7.

D. Person of Ordinary Skill in the Art

As Dr. Lin explains in his Declaration, a POSITA at the time of the '908 patent would have had at least a bachelor's degree in electrical engineering, computer science, or a related field, and at least one year of experience with network design. Individuals with different education and additional experience could still be of ordinary skill in the art if that additional experience compensates for a deficit in their education and experience. EX1001, ¶45-48.

V. CLAIM CONSTRUCTION

Claims in an IPR are interpreted and construed under *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). For purposes of this proceeding only, terms in the Challenged Claims need not be construed. If Patent Owner ("PO") raises claim

construction arguments, Petitioner reserves the right to respond. Petitioner notes, however, that in a previous case, PO contended that “multilink request” means “request relating to a multilink connection,” and that “multilink session” means “session relating to a multilink connection.” EX1039, 12-13. Petitioner disagrees with PO, but notes that the Challenged Claims are rendered obvious by Kotzin and Phatak even under Petitioner’s constructions.²

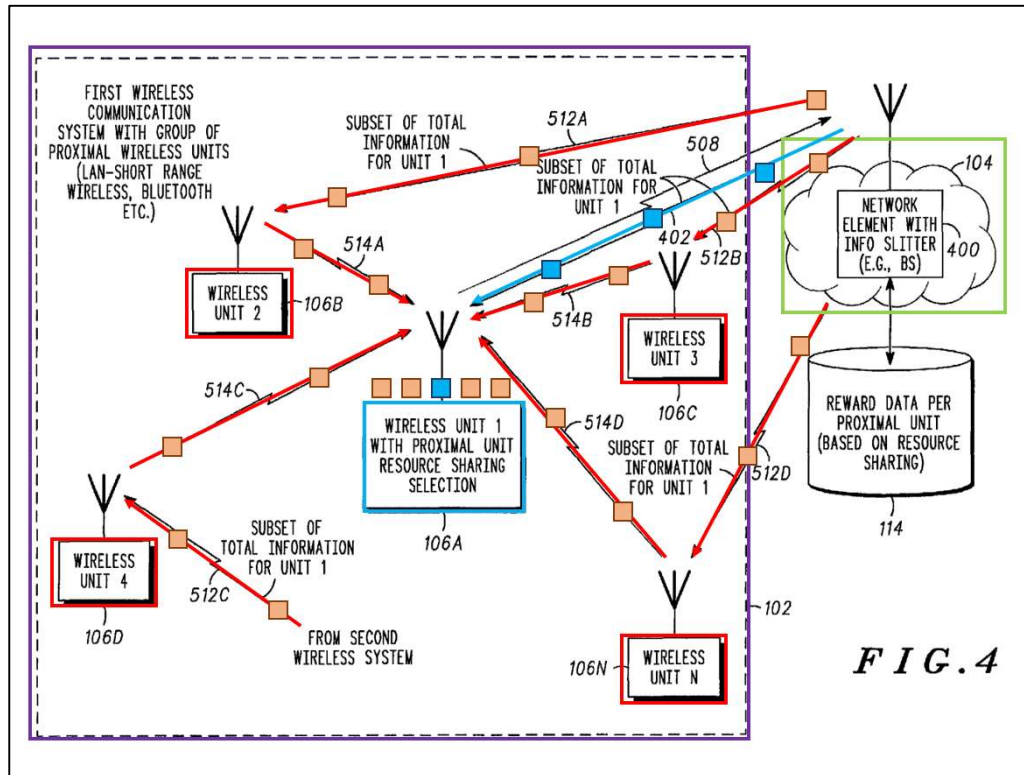
VI. OVERVIEW OF THE PRIOR ART

A. Kotzin

Kotzin discloses a bandwidth aggregation system where, for a particular multilink communication session, the bandwidth available to a plurality of wireless units in a wireless network can be shared with a primary wireless unit, thereby increasing the wireless bandwidth available to the primary wireless unit. EX1018, Abstract. Kotzin explains that, for a given multilink communication session, wireless units connect with each other so units “receive portions of the

² Petitioner does not present any §101 or §112 challenges herein but reserves the right to challenge the patentability under §§101 and 112 in litigation or any other appropriate forum. Nothing contained in this Petition or supporting papers is an admission or acknowledgement that the specification of the ’908 patent satisfies §§101 and 112.

communication on behalf of the destination wireless apparatus,” resulting in higher effective bandwidth. *Id.* ¶¶[0028], [0031], [0035]. Kotzin’s system is illustrated below:

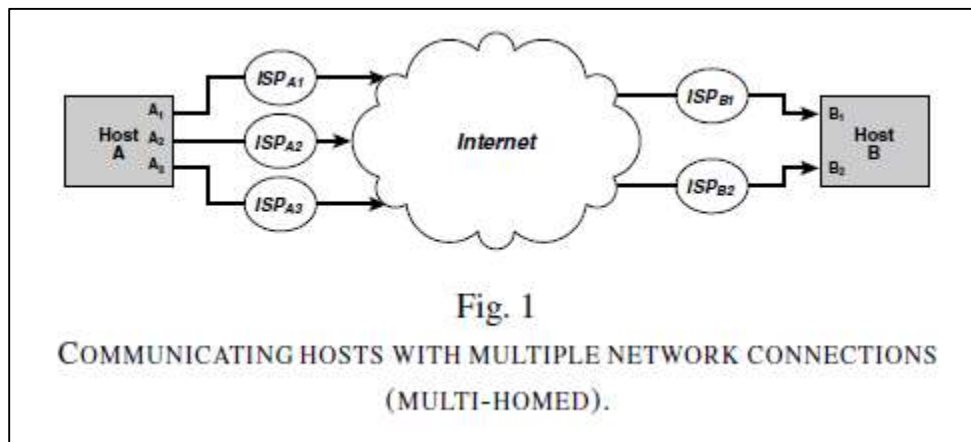


With reference to Kotzin’s Figure 4 shown above, Kotzin discloses that wireless unit 106A (blue), for example, can make use of bandwidth from wireless units 106B, 106C, 106D, and 106N (red) to receive data from a device 400 on external network 104 (e.g., a web server on the Internet) (green). Thus, Internet data packets from an Internet server destined for wireless unit 106A can be split among multiple links to each of the wireless units 106A, 106B, 106C, 106D, and 106N, and then relayed from each of 106B to 106N to be aggregated by 106A. In this manner the bandwidth available to 106A is increased by using, in addition to its

own bandwidth, additional bandwidth allocated to wireless units 106B, 106C, 106D, and 106N. *Id.*, ¶¶[0035], [0036].

B. Phatak

Phatak discloses a system that uses a TCP “tunneling” technique for bandwidth aggregation over multiple links. EX1045, Abstract, 774-76. Phatak discloses that two devices, such as a client and server, can exchange a single TCP/IP data flow over multiple interfaces/links—for example a wireless interface such as cellular or WiFi and a wired interface such as Ethernet. *Id.* Figure 1 of Phatak illustrates an exemplary architecture. HOST A has multiple interfaces A1, A2, and A3, while HOST B has interfaces B1 and B2:



Phatak explains that total bandwidth for TCP/IP communications between HOST A and HOST B can be increased by aggregating the bandwidth over multiple interfaces. EX1045, 773. Phatak teaches that a primary connection will use two interfaces, for example A1 and B1. *Id.*, 773-74. A secondary connection may use interfaces A2 and B1, on the other hand. *Id.* Because TCP/IP requires for

successful operation a session ID in the form of a tuple consisting of source IP address, source port, destination IP address, and destination port (in addition to a protocol identifier), the same tuple must be used for all connections in order for the packets to be recognized as part of the same session/connection. *Id.*, 775. To achieve this, Phatak teaches that when data is sent on non-primary interface A2 to interface B1, packets are addressed as if interface A1 were the source address, but then are encapsulated in an IP-in-IP packet that uses interface A2 as the source address and IP-in-IP as the protocol identifier. *Id.* When this encapsulated packet is received at Host B, the outer packet is removed to reveal the primary source interface A1, letting Host B recover the TCP tuple and determine that the packet is for an existing TCP session/connection. As Phatak explains:

Our solution to these problems is to employ *tunneling*. At the sender side, *A*, the transport layer assembles all packets as if they were going through *A*₁ and addressed to *B*₁. The packets going out on interface *A*₂ then get encapsulated in a new IP packet with an extra header having destination address *B*₁ and source address *A*₂. The protocol field for the outer header should be IP-in-IP (also used for tunneling in the mobile IP standard and implementations [28], [29], [30], [31]). The destination, *B*, can then recognize IP-in-IP packets and strip the outer header. This leaves the original packet with proper source and destination addresses to be delivered up the stack to TCP in a transparent manner. The TCP stack at *B* is unaware that *A* tunneled the packet through an alternate interface.

Id. Phatak also teaches that Host B can accept data on multiple interfaces as well, and that the same tunneling mechanism is used:

Note that the same tunneling mechanism can be used when B is accepting data on multiple interfaces. For instance, to send a packet through interfaces A_3 and B_2 , the original packet (having source and destination addresses $\text{Addr}(A_1)$ and $\text{Addr}(B_1)$ respectively) is encapsulated in a packet having source address $\text{Addr}(A_3)$ and destination address $\text{Addr}(B_2)$. The receiving IP stack at B strips the outer header, realizes that the inside packet is for an existing TCP connection, and transparently passes it to TCP.

Id.

In this manner, by combining a single TCP/IP flow over multiple parallel links/connections, total bandwidth is increased. EX1045, Abstract (“Furthermore, since wireless bandwidth is likely to remain a scarce resource, we foresee scenarios wherein mobile hosts will require simultaneous data transfer across multiple IP interfaces to obtain higher overall bandwidth . . . We then propose a new mechanism to aggregate the bandwidth of multiple IP links by splitting a data flow across multiple network interfaces at the IP level. Our method is transparent to transport (TCP/UDP) and higher layers. We have analyzed the performance characteristics of the aggregation scheme and demonstrated significant gain when the links being aggregated have similar bandwidth and latency.”).

C. Peirce

Peirce discloses a bandwidth sharing system where a data stream from a source to a destination is transmitted over two or more links, forming a “bundle” in one preferred embodiment relating to MLPPP, although Peirce is not limited to MLPPP. EX1044, Abstract. Each link terminates in what Peirce refers to as a “termination unit,” which in one embodiment is described as a network access server. *Id.*, Abstract, 2:43-46, 4:11-14. The termination units are all in communication with one another, such as over a local area network. *Id.* 2:43-47, 4:31-32. One of the termination units is responsible for assembling the multiple data streams into a single stream and delivering that single stream to the destination, such as a computer. *Id.* 4:46-48.

In order to achieve this reconstruction of the data stream, each of the other termination units forwards packets it receives for a specified session to the reconstructing termination unit, which then combines all of the streams into a single stream and delivers it to the destination. *Id.* 4:40-61. In order to coordinate this link sharing and reconstruction, the coordinating termination unit sends a “bundle mapping update packet” to each of the other termination units that includes a session identifier, and which instructs the termination units to forward packets they receive for that session to the reconstructing termination unit. *Id.* 4:62-67. In describing the “bundle mapping update packet,” Peirce explains that

“[t]he identification field notifies the other termination units that if they should receive a portion of the data stream via a channel *that belongs in the call originator’s ‘bundle’, representing the session*, they should forward their packets of data to the designated termination unit, such as by encapsulating the packets within an MPIP redirection header.” *Id.* 2:59-65. While Peirce’s preferred embodiment is an ISDN call implementation, Peirce is expressly more broadly applicable to other types of data streams and other systems and topologies: “While the following discussion is based on an ISDN implementation, it will be appreciated that the techniques are applicable to other types of communication systems (such as T-1) and other WAN topologies.” *Id.* 3:58-61.

D. Held

Held is a textbook on data networking that discloses the use of the TCP/IP routing protocol. Held discloses that at least as of the priority date of the ’908 patent (and even earlier), the TCP/IP routing protocol was widely used for client-server communications on the Internet. EX1020, 8-11.

E. Decasper

Decasper discloses the general architecture for an Internet Web server in the 2000 timeframe, including conventional components such as a processor, memory (e.g., RAM), a bus which coupled the processor and memory, a mass storage

device (e.g., a magnetic or optical disk) coupled to the processor and memory through an I/O controller and a network interface. EX1021, 1:18-27.

VII. SPECIFIC GROUNDS FOR PETITION UNDER 37 C.F.R. § 42.104(B)

A. Grounds IA/IB: Obvious Over Kotzin, or Alternatively Obvious in view of Kotzin in combination with Peirce, Held, or Decasper, under §103

1. Motivation to Combine

Although Kotzin alone (Ground IA) renders the Challenged Claims obvious, a POSITA would have been motivated to combine Kotzin with Peirce, Held, or Decasper (Ground IB), which further renders the Challenged Claims obvious.

a. Peirce

First, a POSITA would have been motivated to incorporate Peirce’s teaching of a session identifier into Kotzin, rendering claims 8 and 17 of the ’908 patent obvious. Kotzin expressly teaches that Kotzin’s wireless units only share bandwidth for a *particular communication session*: “Accordingly, a peer-to-peer communication technique is used to allow the plurality of proximal wireless units to use each other’s short range wireless communication resources *for a given communication session* including a data transmission session, voice or audio transmission session, or any other information as desired.” EX1018, ¶[0021]. A POSITA reading Kotzin would have understood that Kotzin’s system needs to provide a way for its wireless units to distinguish between communication sessions. EX1001, ¶69. Kotzin, however, does not provide a discussion of the

precise mechanism used. Peirce, which also discloses a system for bandwidth sharing, discloses a mechanism for identifying and coordinating data streams on a per-session basis, namely a “bundle mapping update packet” that includes a session identifier in the form of an “identification field [that] notifies the other termination units that if they should receive a portion of the data stream via a channel that belongs in the call originator’s ‘bundle’, *representing the session*, they should forward their packets of data to the designated termination unit.” EX1044, 2:59-64. This packet includes a bundle ID that identifies the session. *Id.* 2:57-65. Data packets in Peirce’s system include a bundle ID in the transport layer protocol payload, which in the case of Peirce’s disclosure is UDP. EX1044, 5:60-6:21.

Given Kotzin’s express teaching of the need for a session identifier, it would have been obvious to a POSITA to incorporate Peirce’s teaching of a session identifier that the wireless units reference when they receive data from Internet Web server 400, and based upon which they can forward the data to UNIT 1 (106a). As Dr. Lin explains, the use of a session ID would have been compatible with Kotzin’s disclosed architecture, and it would have been obvious to include such a session ID with Kotzin’s messages 510 and 512, so that the session ID would be included with all data packets as a coordinating reference that ensures UNIT 1 receives all packets destined for it while at the same time satisfying

Kotzin's express teaching that the wireless units only share bandwidth for a particular session. EX1001, ¶¶75-77. A POSITA would also have understood and found obvious that this session ID would also have been helpful in the upload direction, when UNIT 1 is uploading data to Internet Web server 400, as the session ID will ensure the bandwidth-sharing wireless units only forward packets to server 400 for the particular session to which the packets pertain. EX1018, ¶¶[0042], Fig. 7; EX1001, ¶76.

Kotzin and Peirce both relate to using multiple links between a source and destination to send a split data stream that is reconstructed into a single data stream at the destination. EX1018, Abstract; EX1044, Abstract. Given this architectural and functional similarity, a POSITA would naturally have looked to Peirce for a specific mechanism to implement Kotzin's express teaching of the need for a session identifier in order to limit the participation of the bandwidth-sharing wireless units only to a particular session. As Dr. Lin explains, using a mechanism such as Peirce's session ID with Kotzin would have been obvious to try, and nothing more than combining prior art elements according to known methods and applying a known technique to a known device ready for improvement, both to yield predictable result. EX1001, ¶77. Further, given that packet-based communications were well known in the art, a POSITA would have had a reasonable expectation of success in implementing such a common and well-

known technology with Kotzin using routine computer programming techniques to add an identifier to the packets being transmitted and received in Kotzin's system. *Id.* ¶77.

b. Held

To the extent Kotzin alone does not disclose the use of a URL or a session identifier as claimed in claims 8 (session ID) and 17 (session ID and URL), a POSITA would have been motivated to include these features in Kotzin's system as taught by Held, rendering the claims obvious.

Kotzin expressly teaches communicating with an Internet server, and Dr. Lin explains that when Kotzin was filed (and well before), the HTTP protocol was typically used for Internet communications. EX1001, ¶97. Held confirms this fact, and also explains that the HTTP protocol made use of URLs in addressing Internet servers. For example, Held explains that “[w]hen users access a Web page, they **transmit a universal resource locator (URL) address** that represents the document they wish to view. **This address is transported using the HTTP within a packet.** The HTTP consists of an address that totals fewer than 100 characters, which are used to frame **the address to which the message is being transported, as well as the address of the originator of the request.** The destination Web server uses the document address to locate the requested page on the server, retrieves it from disk, and forms a packet using the source address from

the incoming packet as the destination address for the outgoing packets.” EX1020, 765. A POSITA would have been motivated to use HTTP and URLs as taught by Held with Kotzin given Kotzin’s express teaching of communication with an Internet Web server, as this was the predominant mode of Internet communication by the Priority Date. EX1001, ¶¶65, 96. Use of HTTP with Kotzin would have been a routine use of a well-known technology, and would have yielded predictable results with a reasonable likelihood of success. *Id.* ¶96.

Additionally, a POSITA would have been motivated to use the TCP/IP protocol with Kotzin as taught by Held, which includes the TCP/IP tuple session identifier comprised of source address, source port, destination address, destination port, and protocol identifier. As RFC 2663 (the 1999 standard addressing network address translation used in Internet communications) explains, “TCP/UDP sessions are uniquely identified by the tuple of (source IP address, source TCP/UDP port, target IP address, target TCP/UDP port)” (UDP is a separate protocol that uses the same tuple as TCP). EX1043 at §2.3.

Given Kotzin’s express disclosure of the need for a session identifier, the TCP/IP tuple would have been one of many potential choices for the session identifier. EX1001, ¶¶68, 71. Kotzin explains that its network element 400 can be an Internet Web server, and Held explains that Internet communications are based on TCP/IP, which sits under the HTTP layer: “The elimination of price

discrimination between voice and data services can lead to dramatic reductions in the price of voice calls, precipitating significant changes in market structure. These changes were first evident in the emergence of the Internet, a ubiquitous network of applications based on the TCP/IP. Started as a text-based network for scientific communication, the Internet grew dramatically in the late 1980s and 1990s, once not-text-only applications became available. The Internet now reaches about half a billion computers, most of which are connected to it through the telephone network.” EX1020, 142. Given Kotzin’s express teaching of Internet web communications and Held’s teaching that use of TCP/IP for Internet communications is “ubiquitous,” it would have been obvious to a POSITA to use TCP/IP (which uses the tuple session identifier) when communicating with Kotzin’s web server 400. EX1001, ¶78. The use of TCP/IP with Kotzin would have been obvious to try, and nothing more than combining prior art elements according to known methods and applying a known technique to a known device ready for improvement, both to yield predictable result. Further, given that TCP/IP was well known in the art, a POSITA would have had a reasonable expectation of success in implementing such a common and well-known technology with Kotzin. Ex.1001 ¶79.

c. Decasper

To the extent Kotzin alone does not disclose implementation details of its disclosed Internet web server 400, a POSITA would have looked to references like Decasper to provide that information for purposes of claim 8. Decasper includes a background discussion of the client-server model used for communications between clients and servers on the Web, and explains that a Web server will typically include “conventional components such as a processor, memory (e.g., RAM), a bus which coupled the processor and memory, a mass storage device (e.g., a magnetic or optical disk) coupled to the processor and memory through an I/O controller and a network interface, such as a conventional modem.” EX1021, 1:18-27. As Dr. Lin explains, a POSITA would have been motivated to use this well-known processor-based server architecture as taught by Decasper to implement Kotzin’s Internet web server, as it was the most common architecture used for Internet communications. EX1001, ¶59. The use of a processor to control an Internet web server would have been obvious to try, and would have required nothing more than combining prior art elements according to known methods and applying a known technique to a known device ready for improvement, both to yield predictable result. *Id.* ¶59. Further, given that processor-based Internet Web servers were well known in the art and stock devices available for purchase, a POSITA would have had a reasonable expectation of success in implementing such

a common and well-known technology with Kotzin's Internet Web server. EX1001 ¶59.

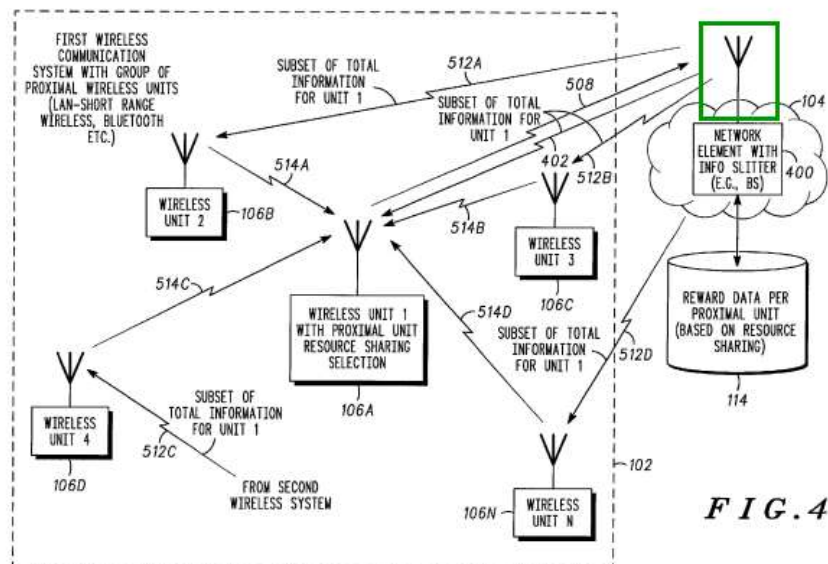
2. **Independent Claim 8**

a. Preamble

Kotzin discloses “a network element 400, such as a cellular base station (BS), *Internet Web server*, or any other suitable unit within the second wireless communication system 104, [that] splits (i.e., distributes) a communication destined for the wireless apparatus 106 *a*, which is information to be communicated for the wireless apparatus 106 *a*, when the wireless apparatus 106 *a* indicates that it does not have sufficient bandwidth but that other proximal units within the short range local area network 102 will receive portions of the communication on behalf of the destination wireless apparatus 106 *a*.” EX1018, ¶[0035]. Kotzin further describes second wireless communication system 104 of which network element 400 is a part as “a wireless wide area network (WAN) communication system 104 such as a digital cellular communication system, the Internet, or any other suitable communication system.” Network element 400 is herein after referred to as “Internet web server 400,” consistent with Kotzin's express disclosure.

Thus, Kotzin discloses a server such as Internet Web server 400, and also that the server provides multilink communication with wireless unit 106a via other

b. Limitation [8.a]



communicate with client devices, it must have a network interface over which it can transmit and receive data. EX1001, ¶56.

c. Limitation [8.b]

A POSITA would have understood and found obvious that Internet Web server 400 is controlled by one or more processors, and that they are coupled—directly or indirectly—with the server’s network interface in order to be able to send and receive data to/from Kotzin’s wireless units. EX1001, ¶57. The use of processors in Internet Web servers was well known and understood by 2002 priority date and long before. For example, Decasper includes background discussion of the client-server model used for communications between clients and servers on the Web, and explains that a Web server will typically include “conventional components such as a processor, memory (e.g., RAM), a bus which coupled the processor and memory, a mass storage device (e.g., a magnetic or optical disk) coupled to the processor and memory through an I/O controller and a network interface, such as a conventional modem.” EX1021, 1:18-27. It would have been obvious to a POSITA to use this well-known processor-based server architecture as taught by Decasper, for the reasons explained in Section VII.A.1.c above which is incorporated herein by reference.

d. Limitation [8.c]

First, Kotzin discloses receiving a first multilink packet over the at least one server network interface, the first multilink packet comprised of a request for a multilink communication. For example, messages 508a to 508d sent by 106A to Internet Web server 400 are each a request for a multilink communication, in that they request that Internet Web server send data for the same communication session to each of Units 2, 3, 4, and D when requested. EX1018, ¶[0039], Fig. 5. As Kotzin explains, “bandwidth distribution message 508 [] notifies the wide area network which of the plurality of proximal wireless units will participate in sharing the wireless resources for use in facilitating communication with the wireless apparatus 106 *a*. This message may include, for example, the maximum bandwidth that was provided by each of the proximal wireless units in response to the query by the wireless apparatus 106 *a*. In this example, the distribution message 508 indicates that one megabit per second can be sent to the wireless apparatus 106 *b*, two megabits per second can be sent to wireless apparatus 106 *c*, two megabits per second can be sent to wireless apparatus 106 *d*, and five megabits per second can be sent to wireless apparatus 106 *n*.” EX1018, ¶[0039].

Kotzin further discloses that “the wireless apparatus 106 *a* itself may also participate [and] receive a portion of the message destined for it.” EX1018, ¶[0039]. As Dr. Lin explains, when 106a is also participating in the multilink

communication, it will also send a bandwidth distribution message 508 to Internet web server that indicates that amount of bandwidth that can be sent to 106a. EX1001, ¶63.

Messages 512 are also “multilink requests messages,” because they request that Internet Web server 400 send a specific amount of data to each of the participating wireless units. Although not depicted in Figure 5, a POSITA would understand that when 106a is itself participating in the multilink communication so that it is receiving data directly from Internet Web server 400 rather than through another wireless unit, 106a will also send a message 512 asking it to transmit a specific portion of the overall data to 106a. EX1001, ¶63.

Second, when 106A is requesting that Internet Web server 400 send data directly to it, a POSITA would have understood that messages 508 and 512 would include first information associated with first network communication interface of the device that is capable of being used by the device to receive data packets, specifically the address of that interface so that Internet web server knows where to send the data. For example, a POSITA would have understood that when Kotzin’s server is an Internet Web server, TCP/IP would most likely be used as the communication protocol, and that any TCP/IP packet would include the IP address of wireless unit 106A’s cellular interface, which is information associated with the

interface that 106A is using to receive data directly from Internet Web server 400. EX1001, ¶¶ 67, 68.

Third, while Kotzin does not expressly disclose that its messages 508 and 512 are packets, it would be obvious to use packet-based messages with Kotzin. Kotzin discloses that its wireless units can communicate using the IEEE 802.11 and Bluetooth protocols, which use packet-based communications. EX1018, ¶[0022]; EX1001, ¶63 (citing EX1052 at 54; EX1053 at 14; EX1058, 27). Kotzin also discloses that its wireless units communicate with Internet Web servers, which a POSITA would have understood and found obvious use data packets based on the TCP/IP protocol. EX1018, ¶[0035]; EX1001, ¶67. Kotzin further discloses that its wireless units can communicate with a GSM or CDMA network, which a POSITA would have known also use packet-based communication. EX1018, ¶[0034]; EX1001, ¶63 (citing EX1054; EX1055; EX1058, 520).

e. Limitation [8.d]³

Kotzin depicts in Figure 4 Internet Web server 400 sending packets directly to UNIT 1's (106A's) cellular interface, which is the claimed "first network communication interface of the device." EX1018, ¶[0035]; Fig. 4.

³ Petitioner notes that there is no antecedent basis for "the multilink session identification" and submits that claim 8 is invalid for this additional reason.

Second, a POSITA would have found it obvious to include a multilink session identifier with data packets during a bandwidth-sharing communication session in Kotzin. As Kotzin explains explicitly, the wireless units only share bandwidth for a given communication session: “Accordingly, a peer-to-peer communication technique is used to allow the plurality of proximal wireless units to use each other’s short range wireless communication resources *for a given communication session* including a data transmission session, voice or audio transmission session, or any other information as desired.” EX1018, ¶[0021]. As such, a POSITA would have understood and found obvious to include with Kotzin’s messages/data packets a session identifier so that the wireless units may differentiate different communication sessions from one another. As Dr. Lin explains, one straightforward example of such a session ID is simply an arbitrary or randomly generated number that is used as the session ID. EX1001, ¶70. The use of arbitrary or randomly generated numbers for tracking sessions was well known in the art as of 2002. For example, randomly generated session IDs have been used with web-based applications since at least 2001. These session IDs were typically generated by the web server and stored in a cookie in order to “to associate a group of online actions with a specific user.” EX1001, ¶70 (citing EX1049 at 3). As another example, as early as 1998, the Real Time Streaming Protocol (RTSP, RFC2326), used a randomly generated session ID included in the

packet headers of packets send between client and server. *Id.* (citing EX1055, §3.4 Session Identifiers). Similar random session IDs are used in the Session Initiation Protocol (SIP, EX1046 (RFC 2543)) from 1999, and the Dynamic Host Configuration Protocol from 1997 (DHCP, EX1047 (RFC 2131), §2 (using a random number “Transaction ID” that is “used by the client and the server to associate messages and responses between a client and a server”)). EX1001, ¶70.

Another example of a session identifier that would already be present in Kotzin’s system, and that would have been known and obvious to a POSITA, is the tuple used in TCP/IP. The TCP protocol running on top of the IP protocol, known as TCP/IP, is used with Web browsing, and would have been obvious to use with Kotzin for the reasons discussion in Section VII.A.1.b above. TCP makes use of a tuple comprised of source IP address/port number and destination IP address/port number (and also the protocol in use) to uniquely identify a communication session. As RFC 2663 (the 1999 standard addressing network address translation used in Internet communications) explains, “TCP/UDP sessions are uniquely identified by the tuple of (source IP address, source TCP/UDP port, target IP address, target TCP/UDP port)” (UDP is a separate protocol that uses the same tuple as TCP). EX1043 at §2.3. TCP/IP runs underneath the HTTP protocol that is used to browse web pages. EX1001, ¶¶70, 102 (citing EX1048).

Given Kotzin’s express teaching of Internet Web browsing and the need to differentiate different communication sessions for purpose of data sharing, a POSITA would have been motivated to use the TCP/IP identification tuple, for example the identification tuple between 106A and the website 400, for this purpose since it already exists in the system. In view of Kotzin’s teaching of the need for a session identifier, a POSITA would have understood and found obvious to include the TCP/IP tuple for the primary flow between 106a and 400, just like a randomly generated session ID, as part of the data payload in communications associated with that session including the messages exchanged with the bandwidth-sharing units, thereby enabling the bandwidth-sharing wireless units to identify a specific multilink communication session. EX1001, ¶70; *see also* EX1043. To the extent Kotzin does not disclose the use of TCP/IP, it would have been obvious to a POSITA to use TCP/IP with Kotzin as taught by Held, for the reasons described in Section VII.A.1.b above.

It also would have been obvious to incorporate Peirce’s teaching of a session identifier into Kotzin, as explained in Section VII.A.1.a above. Peirce, which also discloses a system for bandwidth sharing, discloses an express mechanism for identifying and coordinating data streams on a per-session basis, namely a “bundle update packet” that includes a session identifier in the form of an “identification field [that] notifies the other termination units that if they should receive a portion

of the data stream via a channel that belongs in the call originator's 'bundle', ***representing the session***, they should forward their packets of data to the designated termination unit." EX1044, 2:59-65. This packet includes a bundle ID that identifies the session. *Id.* 2:57-65. Data packets in Peirce's system include a bundle ID in the transport layer protocol payload, which in the case of Peirce's disclosure is UDP. EX1044, 5:60-6:21; EX1001, ¶74. Given Kotzin's express teaching of the need for a session identifier, it would have been obvious to a POSITA to incorporate Peirce's teaching of a session identifier into the TCP layer payload that the other wireless units reference when they receive data from Internet Web server 400, and based upon which they forward the data to UNIT 1. EX1001, ¶¶74.

f. Limitation [8.e]

First, Kotzin discloses that Internet Web server 400 receives a "second multilink packet" over its server network interface, specifically message 508 or message 512 received from a bandwidth sharing unit such as Unit 2, 3, 4, or N in Figures 4 and 5 (as opposed to being received from Unit 1 itself). These messages 508 and 512 are multilink packets because they request that Internet web server 400 participate in a multilink communication session.

Second, messages 508 and 512 include information associated with a second communication interface of UNIT 1 (106A), the claimed "device." That

information is the network address of a bandwidth-sharing wireless unit providing extra bandwidth to 106A. For example, as shown in Figure 5, messages 508 and 512 identify the particular wireless unit to which data should be sent on behalf of UNIT 1 (106A). When Internet Web server 400 sends to data to a bandwidth sharing wireless unit such as UNIT 2, for example, UNIT 2 will forward that data to the UNIT 1's LAN interface, such as its 802.11 interface. EX1018, ¶[0041]. This interface is different from UNIT 1's cellular interface. *Id.*, [0022]. Thus, the network address of a bandwidth sharing unit is associated with UNIT 1's LAN interface, because data received by the bandwidth sharing unit will automatically be forwarded to that interface. EX1001, ¶¶80, 81.

Third, it would have been obvious to a POSITA that messages 508 and 512 would include the multilink session identifier discussed above in with regard to limitation [8.d] for the same reasons, since the multilink identifier will tell Internet Web server on whose behalf the other wireless units will be receiving data. In the absence of such an identifier, Internet Web server 400 and the wireless units will not know how to coordinate their communications, *e.g.*, which wireless units are receiving data packets for UNIT 1 (106A), as opposed to some other wireless unit. EX1001, ¶¶69, 80.

g. Limitation [8.f]

Kotzin discloses that Internet Web server 400 can send packets through its cellular interface to (1) UNIT 1's (106A) cellular interface with Internet web server 400 (the claimed "first network communication interface") or (2) the cellular interface of another wireless unit, such as UNIT 2, which forwards those packets to the 802.11/Bluetooth interface of UNIT 1 (106A) (the claimed "second network communication interface"). EX1001, ¶82. For reasons discussed previously, it would have been obvious to include a session ID with these packets. *See* Sections VII.A.2.e, VII.A.2.f.

3. Dependent Claim 9

Kotzin discloses or renders obvious the additional limitation of claim 9 for the same reason as it does limitation [8.f], since the session identifier is unique to the session. *See* Sections VII.A.2.e, VII.A.2.f, VII.A.2.g.

4. Dependent Claim 10

Kotzin discloses or renders obvious the additional limitations of claim 10.

a. Limitation [10.a]

When Kotzin's UNIT 1 uses two other UNITS for bandwidth sharing, the second of such units will be the claimed "third device" and UNIT 1's interface with that second unit will be the claimed "third network communications interface." EX1001, ¶83. Kotzin discloses that its wireless units may support different wireless protocols, such as 802.11 and Bluetooth. EX1018, ¶¶[0003],

[0022]. Kotzin further discloses that wireless units may be on different networks. *Id.* ¶¶[0017], [0022]. It would therefore have been obvious to a POSITA that a wireless unit can use both of those two different interfaces to communicate with other wireless units—one unit that uses 802.11 and another unit that uses Bluetooth. EX1001, ¶83. Indeed, devices with both 802.11 and Bluetooth interfaces were commonplace in the 2002 timeframes. EX1001, ¶83; *see, e.g.*, EX1045, 773 (“For instance, host *A* might be a laptop at an airport with access to the Internet via an 802.11 LAN (say interface A_1), a Bluetooth scatternet (A_2), and a cellular phone modem (A_3)”). The additional interface would be the claimed “third network communication interface,” and it would receive multilink packets over that Interface from the server. EX1001, ¶83.

a. Limitation [10.b]

When three different interfaces on UNIT 1 of Figure 4, for example, are being used for communication with Internet Web server 400, then different groups of packets will be sent to each of those interfaces, directly or indirectly, by Internet Web server 400. EX1018, ¶[0035], Fig. 4; *see, e.g.*, EX1001, ¶83.

5. Dependent Claim 11

Kotzin explains that Internet Web server 400 may reallocate downlink packets to different wireless units based on information received from wireless unit 106 or another wireless unit: “Conversely, during a downlink communication, the

wireless area network may obtain the signal strength level, either from messages that it receives or from queries to the proximal wireless apparatus and attempt to split the communication such that a majority of the information is sent to the wireless units with the higher signal quality levels.” EX1018, ¶[0043]. Kotzin further explains that “[t]his quality information (e.g., signal strength) may be determined by the network element 400 (one or more) or by the wireless apparatus themselves using conventional signal quality detection techniques. The resulting link quality information is then provided to other members of the group of proximal units via peer-to-peer communication and results are communicated with the wide area network to increase efficiency in maintaining an acceptable level of quality of service.” *Id.*, ¶[0035]. For example, 106A would detect that its cellular connection to Internet Web server 400 is too slow, and notify Internet web server 400 via (*e.g.*) message 508 that all data should be sent to the other wireless units on 106A’s behalf. Thus, when Internet Web server 400 receives a message from UNIT 1 for example (which is a multilink packet because it is part of a multilink packet communication as discussed above) or otherwise determines that the signal strength on a particular interface is too low for efficient reception, that interface would be removed from the multilink session by the server so that the server does not send any packets to that interface.

6. Dependent Claim 12

Kotzin discloses that its system may be used to upload packets to Internet Web server 400 from UNIT 1 directly and through other UNITS. EX1018, ¶[0023]. Kotzin further discloses that these packets are received by Internet Web Server 400 on its cellular interface. EX1018, ¶[0035]. As Dr. Lin explains, because these packets take different paths to the server at different speeds (*see, e.g.*, different link speeds noted in Figure 4) and through different interfaces, a POSITA would have understood and found obvious that multilink packets may be received by the Internet Web server at different periods of time over the course of a communication session. EX1001, ¶84.

7. Claim 17

a. Preamble

Kotzin discloses a “client device” in the form of a “wireless unit.” As Kotzin explains, each wireless unit can be “an Internet appliance, radiotelephone appliance, including, but not limited to, hand held apparatus, laptop computers, desk top computers, or any other suitable wireless communication apparatus.” EX1018, ¶[0022]. A POSITA would have understood and found obvious that these are all examples of client devices. EX1001, ¶¶85.

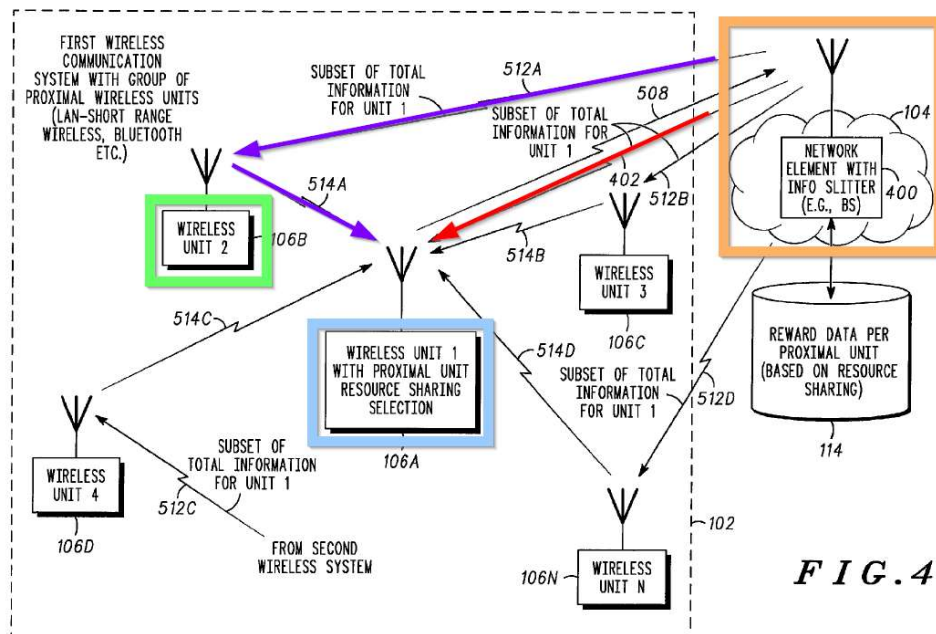
b. Limitation [17.a]

Focusing on wireless unit 106A in Figure 4 of Kotzin as an example (also referred to as UNIT 1 in Figure 4), wireless unit 106A can connect to wide area

network 104 via wireless link 120. EX1018, ¶[0022]. A POSITA would have understood and found obvious that wireless unit 106A will have an interface for communicating over wireless link 120, and that that interface will generally be different from the interface wireless unit 106A uses to communicate with other wireless units. EX1001, ¶86. This is shown as “WAN transceiver” in Figure 1. As Kotzin explains, “the wireless air interface between a wireless communication unit and the wide area network and other local subscriber apparatus will be different. For example, common standardized cellular air interfaces include GSM, IS-95, IS-136 etc.” EX1018, ¶[0003]. Kotzin further discloses that multiple different interfaces between wireless unit 106A and wide area network 104 are possible, for example GSM or CDMA. *Id.*, ¶[0034]. Kotzin further discloses, and a POSITA would have understood and found obvious, that there will be a data transfer rate, *i.e.*, a bandwidth, associated with a wireless unit’s connection to a server on WAN 104. *Id.*, ¶[0028]. For example, Kotzin explains that wireless unit 106A will share the bandwidth of other units when 106A does not have “sufficient bandwidth” to download all of the necessary data from server 400. *Id.*, ¶[0035]. This indicates that wireless unit 106A’s interface with Internet server 400 has an associated bandwidth, albeit an insufficient one. This bandwidth, measured in bits/sec, is *a first data transfer rate associated therewith* (with a path from the server to the first network interface of the client device). EX1001, ¶87.

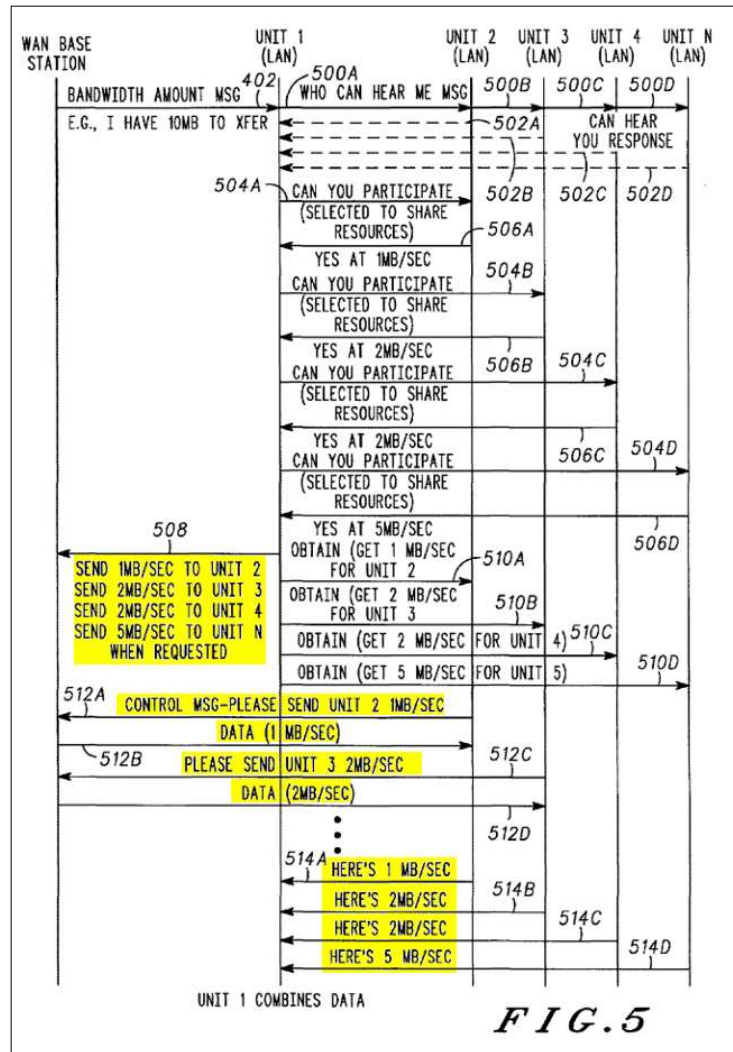
c. Limitation [17.b]

Kotzin's wireless unit 106A has a wireless LAN transceiver depicted in Figure 4 for connecting wirelessly with any of wireless units 106B, 106C, ... 106N, which each have their own transceivers. *See* EX1001, ¶88; EX1018, ¶[0022], Fig. 4. Wireless units 106B, 106C, ... 106N are in turn connected to WAN 104 through wireless link 120. EX1018, ¶[0022]. Thus, Kotzin discloses that wireless unit 106A can be connected to WAN 104 via a second path that is distinct from a direct connection over wireless link 120, namely the path comprised of the wireless connection to another wireless unit plus that wireless units's connection to WAN 104. This is shown, for example, in annotated Figure 4 below.



As shown in Figure 4, wireless unit 106A is connected with WAN server 400 via two paths, a direct path (red arrow) and a two-link path through wireless unit 106B (the purple arrows).

Kotzin further discloses that wireless unit 106 can use a different, second interface to communicate with other wireless units using this transceiver. For example, Kotzin discloses that this second interface can be “Blue Tooth, 802.11, Hiperlan, etc.,” as distinct from a cellular interface used to communicate directly over link 120. EX1018, ¶¶[0003], [0022]. A POSITA would have understood and found obvious that this wireless interface, like any network interface, has an upper bound on the amount of data it can receive per unit time, i.e., a bandwidth or associated data transfer rate, or *a second data transfer rate*. EX1001, ¶90. For example, Figure 5 shows the data rate between Internet server 400 and UNIT 1 (106A) via the path through UNIT 2 (106b) is 1mb/sec. Figure 5 further shows that each of the other paths between UNIT 1 and Internet server 400 has its own data rate (2 MB/sec through UNIT 3, 2MB/sec through UNIT 4, and 5 MB/sec through UNIT N).

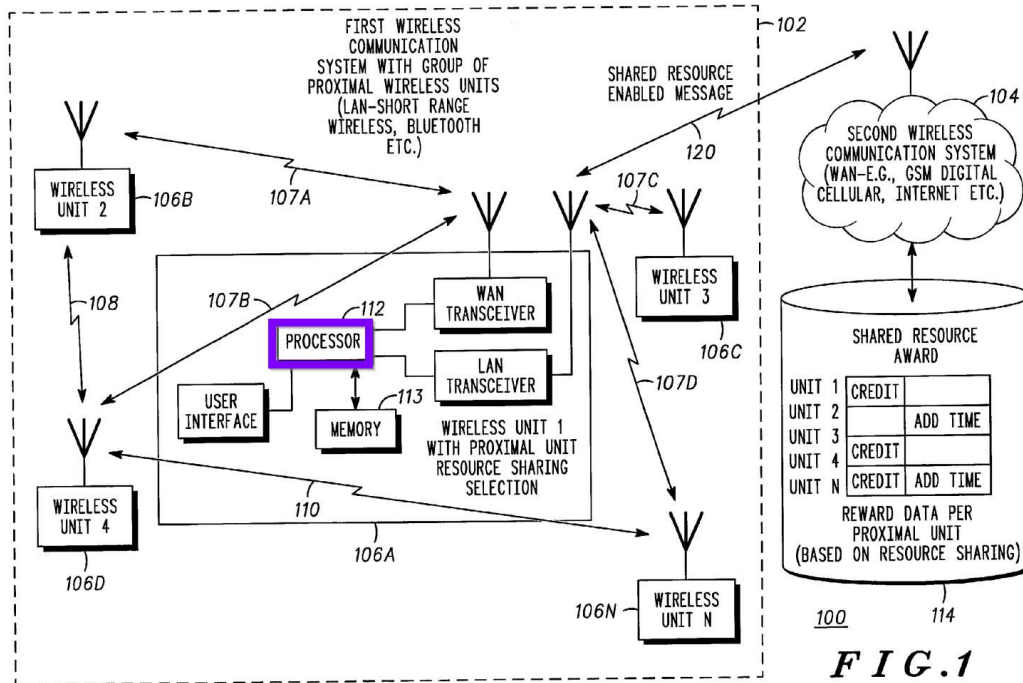


Id. Thus, UNIT 1's 802.11 interface (or other local interface) has an associated transfer rate that is higher than it would be otherwise. EX1018, ¶¶[0019], [0035]; EX1001, ¶¶90, 106.

d. Limitation [17.c]

Kotzin discloses a processor. EX1001 ¶91. Kotzin's wireless unit 106A has a processor 112 "such as a digital signal processor, microprocessor, discrete logic

or any other suitable circuitry that provides the proximal unit resource sharing selection.” See EX1001, ¶91; EX1018, ¶[0023], Fig. 1.



As Kotzin further explains, “[a]s described herein, and as previously noted, each of the wireless apparatus may include a wireless wide area network transceiver and a wireless local area network transceiver along with a processing device that is operatively coupled to the wireless wide area network transceiver and to the wireless local area network transceivers wherein the processing device is operative to perform the above-identified operations. Accordingly, the processing devices may be programmed with executable instructions *that when executed cause the processing device or devices to perform the operations described herein*. As used herein, processing device includes one or more processing devices.” EX1018,

¶[0059]. As Dr. Lin explains, given Kotzin’s disclosure that the processor in each of the wireless units “perform[s] the operations described herein,” a POSITA would have understood and found obvious that Kotzin’s processor is responsible for the bandwidth sharing functionality of its wireless units, including setting up bandwidth sharing, as well as transmitting packets on shared links as well as receiving and assembling packets over shared links. EX1001, ¶92.

e. Limitation [17.d]

First, Kotzin discloses or renders obvious “transmit a first message through the first network interface to at least one server,” for the same reasons discussed with regard to limitation [8.c]. Messages 508 and 512 comprise the claimed “multilink request” when sent by 106A to Internet Web server 400 through 106A’s cellular interface, as previously discussed. *See* Section VII.A.2.d.

A POSITA would have further understood and found obvious that messages 508 and 512 may contain a destination URL when network element 400 is an Internet Web server. The ’908 specification broadly refers to the term “URL” as “a remote computer i.e. internet URL.” EX1007, 12:3-4. Thus, as used in the ’908 patent, the term “URL” includes the claimed server, which a POSITA would have understood and found obvious is identifiable by an address. As Dr. Lin explains, a POSITA would have understood that a message to Web server 400 needs to be

addressed in order to reach it over the Internet, and that messages 508 and 512 need to include the address of Internet Web server 400. EX1001, ¶¶96.

Additionally, as Dr. Lin explains, it would have been obvious to a POSITA that the URL could be an IP address, or alternatively also a domain name such as <http://cnm.com>. EX1030, 200-01; EX1001, ¶97. Indeed, as Dr. Lin explains, HTTP is the protocol that is typically used by a client to communicate with an Internet Web server such as disclosed by Kotzin. EX1001, ¶97; *see, e.g.*, EX1009 (TCP/IP For Dummies), 161. As such, a POSITA would have understood that when the *client device* (router 13) sends a HTTP request to the *server* (router 11), it includes a *destination URL*. *See* EX1020, 765.

As discussed in Section VII.A.2.d above, which is incorporated herein by reference, a POSITA would also have been motivated to use HTTP and URLs as taught by Held with Kotzin given Kotzin's express teaching of communication with an Internet Web server. *See* Section VII.A.2.d.

f. Limitation [17.e]

Using wireless unit 106A and Figures 4-6 as an example, after selecting the wireless units to participate in a multilink communication, unit 106A sends a message to Internet Web server 400 through each of the other elements requesting that it send data at a specific data rate to the other wireless units on behalf of wireless unit 106A. *See* EX1018, Figs. 4-6, ¶¶[0035]-[0041].

For example, messages 510A, B, C, and D depicted in Figure 5 are control messages that tell UNITS 2, 3, 4, and N the amount of data they are to obtain from Internet Web server 400 on behalf of unit 106A.

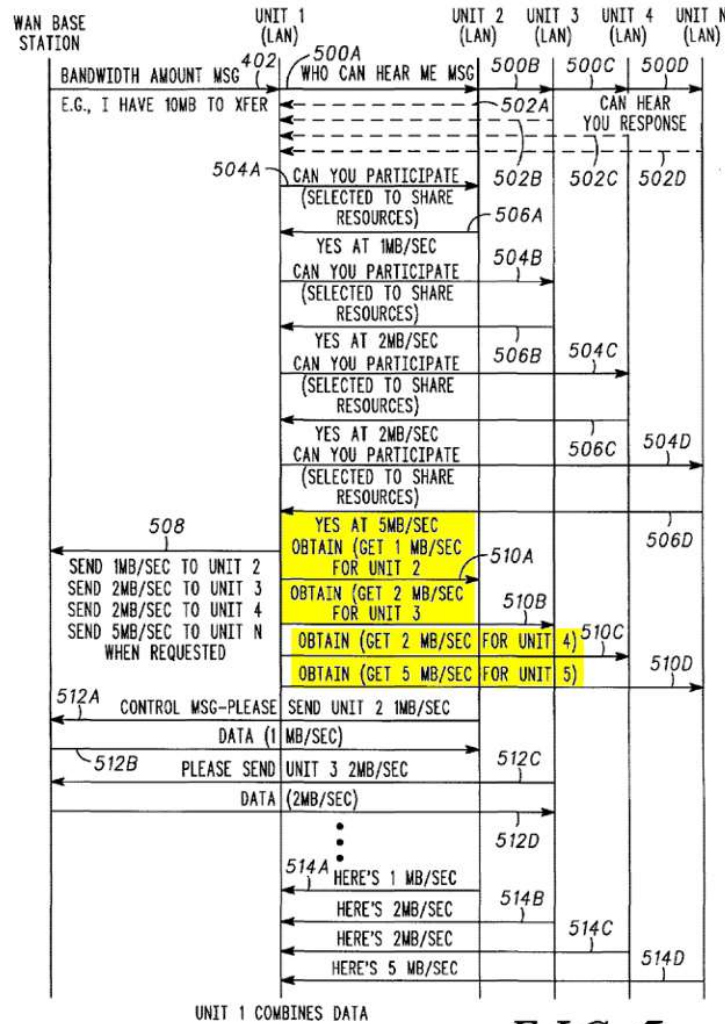


FIG. 5

Id. Fig. 5. UNITS 2, 3, 4, and N in turn relay the message—*i.e.*, the amount of data they are to obtain on behalf of unit 106A—to network element (Internet web server) 400 in the form of messages 512.

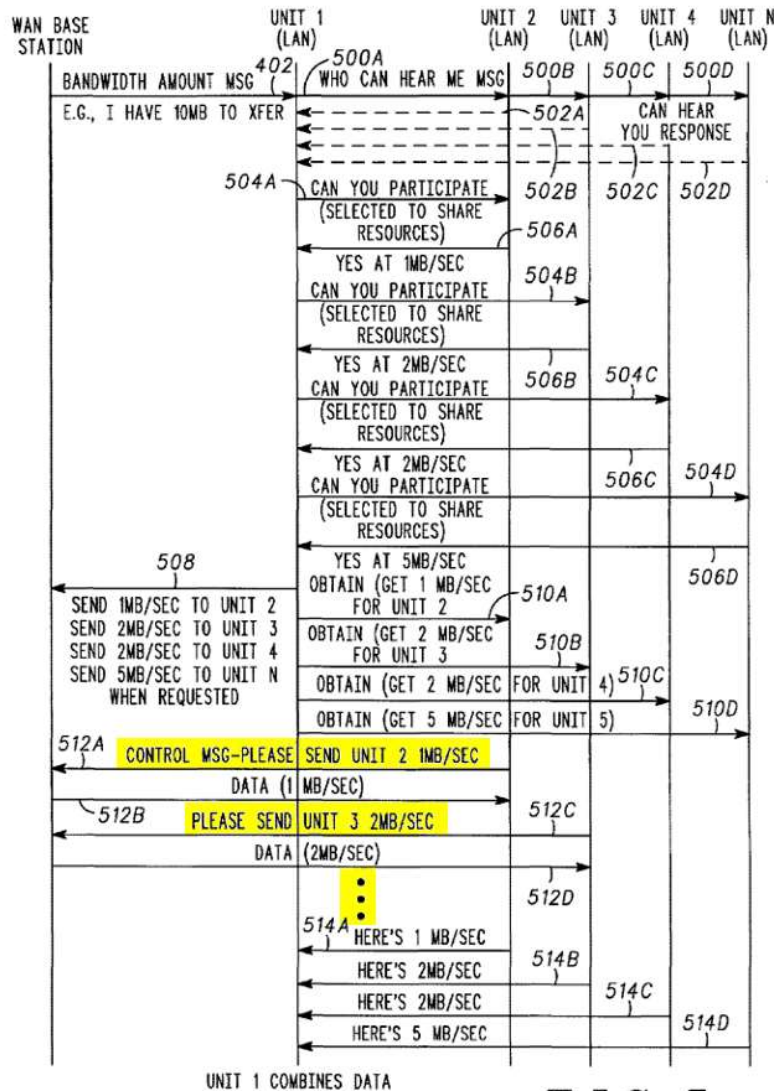


FIG. 5

Id. Fig. 5. This relay-mechanism is exactly what is described in the specification of the '908 patent. EX1007, 12:51-66. These messages 512 are each a "second message." EX1001, ¶¶99. Messages 510 also meet this limitation, because they contain information that is relayed to Internet Web server 400 originating from UNIT 1. EX1001, ¶¶99.

Additionally, a POSITA would have understood and found obvious that this message would include both a multilink session ID and URL. First, as discussed above, when network element 400 is an Internet Web server, it would have been obvious to use a URL as the address of the Web server. *See* Section VII.A.2.d. As Dr. Lin explains, the other wireless units need to know how to contact the web server in order to relay the message from unit 106A. A POSITA would therefore have understood and found obvious that messages 510 include the URL of the Internet Web server, as must relay messages 512. EX1001, ¶¶100.

Second, a POSITA would also have understood and found obvious that the message would contain a multilink session ID, for the same reasons discussed above with regard to claim 8. *See* Section VII.A.2.e.

g. Limitation [17.f]

For example, Kotzin shows in Figure 4 that Unit 1 (106A) receives data directly from, for example, an Internet Web server (network element 400). As discussed above, UNIT 1 interfaces with Internet Web server 400 (green) using, for example, a cellular interface, which is the claimed “first interface.”

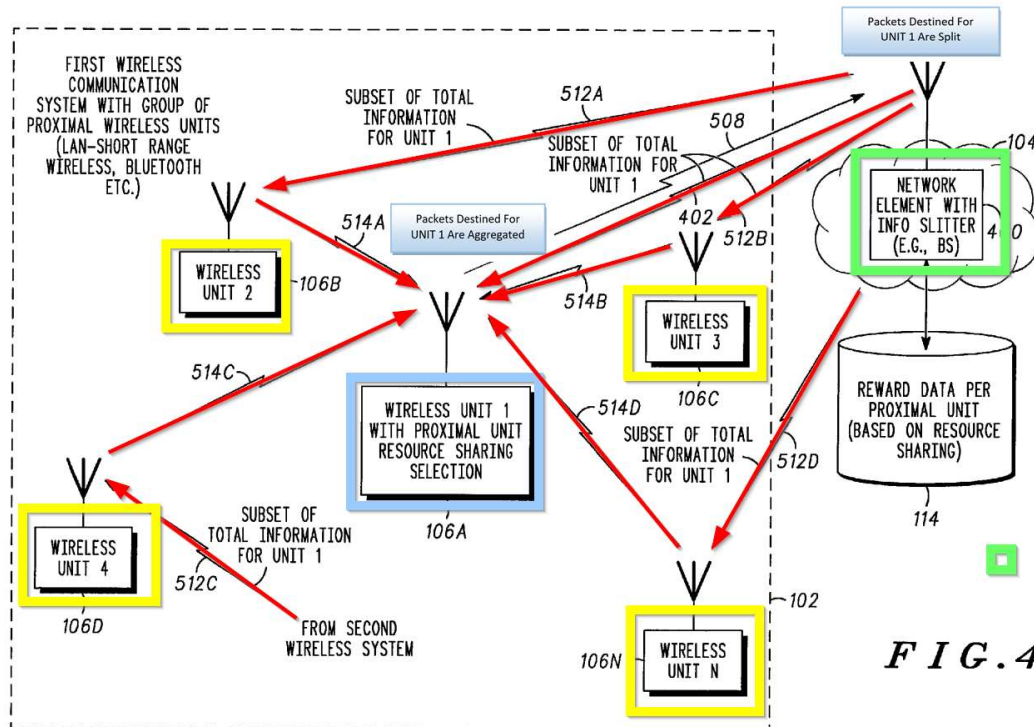


FIG. 4

EX1018, Fig. 4. UNIT 1 (blue) also receives data packets from the Internet Web server 400 on a second interface, namely, its 802.11 and/or Bluetooth interface(s) with another UNIT(s) (yellow). For example, in step 512B of Figure 5, which describes the system of Figure 4, Internet Web server 400 sends 1MB/SEC of data to UNIT 2. And, in step 514A, UNIT 2 forwards 1MB/SEC of data to UNIT 1. UNITS 3, 4, and N also forward data to UNIT 1 if they were selected to share bandwidth.

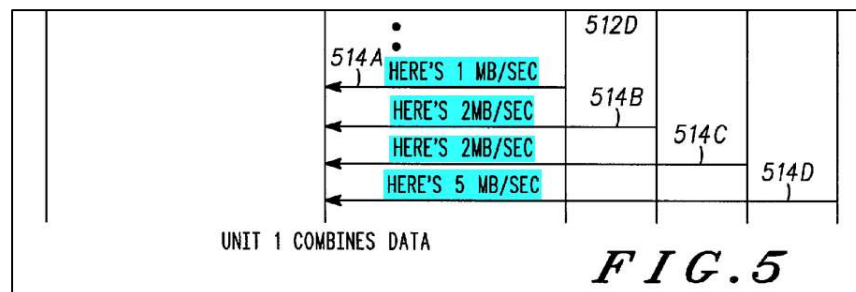


FIG. 5

Id. Fig. 5. As discussed above, Kotzin discloses that the interface between UNIT 1 and each of the other UNITS is a non-cellular interface, such as 802.11 or Bluetooth. Any of these is the claimed “second network interface.” *Id.* ¶[0022].

Kotzin also discloses that data packets are received concurrently on UNIT 1’s WAN (cellular) and LAN (802.11 or Bluetooth) interfaces. As Kotzin explains, “a single common air interface in a subscriber unit can *simultaneously provide a connection* to a wide area network (such as the internet via a point of presence) and other local subscriber units.” EX1018, [0003]. As Dr. Lin explains, because the two interfaces are different, packets can be received on both interfaces simultaneously because the interfaces are not coordinated. EX1001, ¶¶108.

Kotzin also discloses “wherein the first data transfer rate and the second data transfer rate provide an increased data transfer rate of the first path and the second path from the server to the client device.” Kotzin illustrates in Figures 4 and 5 that UNIT 1 aggregates the data received from Units 2, 3, 4, and N with the data it receives directly from the external network 104. *See id.* Figs. 4-5. Although not illustrated in Figure 5, Kotzin explains that “the wireless apparatus *106a itself may also participate in receiv[ing] a portion of the message destined for it*” and depicts this in Figure 4. EX1018, ¶[0039]. Kotzin further explains that the UNIT 1 (106a) can direct the base station or server message 508 as to how “to split the portions of message so that apparatus 106a knows how to combine the message

514a-d” received from the other wireless units. *Id.*, ¶[0041]. Thus, in the situation where UNIT 1 is receiving packets directly from Internet Web server 400 but also packets from the other wireless units, UNIT 1 will aggregate those packets to retrieve the overall communication. Because multiple parallel links are being used by UNIT 1, the overall data transfer rate to UNIT 1 increases as compared to using only a single link. *Id.*, ¶¶ [0031], [0039]; EX1001, ¶106.

8. Dependent Claim 4

Claim 4 depends from independent claim 1, which is not separately challenged in this petition due to the pending *ex parte* reexamination. Claim 4 is not challenged in the reexamination, however, and is therefore challenged in this Petition. Claim 1 is essentially identical to claim 17, and is therefore obvious for the same reasons. The only substantive difference is claim 17’s use of “concurrently,” rendering claim 17 narrower than claim 1.

Claim 4 is also obvious. There is no antecedent basis for “first information” and “second information” in this claim, and Petitioner submits that this claim is invalid for that reason. Dr. Lin explains, however, it would have been obvious to a POSITA that each of the different interfaces on unit 106A would have its own IP address. Otherwise IP packets could not be delivered to unit 106A on these two interfaces. EX1001, ¶¶112, 113. It would also be obvious that packets 508 sent from UNIT 1 to Internet web server 104 will have the IP address of UNIT 1’s

cellular interface, which is “at least one of an Internet address associated with the first network interface.” Similarly, packets 512 sent by each of the other wireless units will include their respective IP address, which is “at least one of an Internet address *associated* with the second network interface” because packets sent to that IP address will be automatically sent to UNIT 1’s associated wireless LAN interface (the claimed “second network interface”). EX1001, ¶¶112-114.

9. Dependent Claim 7

Kotzin discloses that its wireless units can be “hand held apparatus, laptop computers, desk top computers, or any other suitable wireless communication apparatus.” EX1018, ¶[0022]. Thus, Kotzin discloses that its wireless units can be computers or wireless devices. Kotzin also discloses that its wireless units can be 802.11 devices, which is the WiFi standard, and also Bluetooth devices. *Id.* Kotzin also discloses that they can be a “hand held” “radiotelephone appliance,” an example of which is a cell phone. *Id.*

B. Ground II: Obvious Over Phatak, or Alternatively Obvious in view of Phatak in combination with Held, under §103

1. Independent Claim 8

a. Preamble

As one example, Phatak’s HOST A is described as providing streaming data to HOST B (“Suppose *A* wants to stream data to *B* across multiple interfaces to enhance the overall bandwidth.”). EX1045, 773. A POSITA would have

understood and found obvious that when HOST A is providing streaming or other data to HOST B, it is acting as a server vis-à-vis HOST B. EX1001, ¶¶117.

Phatak also teaches that HOST A can stream data to HOST B over multiple interfaces, where each of these interfaces connect to HOST B over different TCP/IP links. For example, Figure 1 shows that HOST A has interfaces A1, A2, and A3 that it can use to both transmit and receive data to and from Host B, which also has multiple interfaces B1 and B2 in the example of Figure 1.

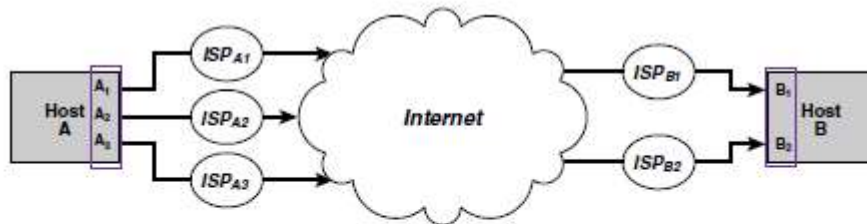


Fig. 1

COMMUNICATING HOSTS WITH MULTIPLE NETWORK CONNECTIONS
(MULTI-HOMED).

EX1045, Fig. 1; 773-775. Phatak therefore also discloses a multilink connection. EX1001, ¶¶117.

b. Limitation [8.a]

Phatak teaches that HOST A has at least one network interface, for example 802.11 interface A1. EX1045, 773 (“For instance, host *A* might be a laptop at an airport with access to the Internet via an 802.11 LAN (say interface A_1), a Bluetooth scatternet (A_2), and a cellular phone modem (A_3). In general, the IP addresses assigned to interfaces A_1 , A_2 , and A_3 will be controlled by separate

Internet Service Providers (ISPs) who might in turn implement firewalling to various degrees”).

c. Limitation [8.b]

Phatak teaches that HOST A, the claimed “server,” can be a laptop computer. EX 1045, 773 (“For instance, host *A* might be a laptop at an airport with access to the Internet via an 802.11 LAN (say interface A_1), a Bluetooth scatternet (A_2), and a cellular phone modem (A_3).”). A POSITA would have understood and found obvious that a laptop includes a processor in the form of a CPU that controls operation of the laptop, including network communications. EX1001, ¶¶118; *see* EX1020, 816.

d. Limitation [8.c]

Phatak’s bandwidth aggregation method is based on the use of TCP/IP, the most common Internet protocol. EX1045, Abstract. Indeed, Held explains that the use of TCP/IP for Internet communications were “ubiquitous”: “The elimination of price discrimination between voice and data services can lead to dramatic reductions in the price of voice calls, precipitating significant changes in market structure. These changes were first evident in the emergence of the Internet, a ubiquitous network of applications based on the TCP/IP. Started as a text-based network for scientific communication, the Internet grew dramatically in the late 1980s and 1990s, once not-text-only applications became available. The Internet

now reaches about half a billion computers, most of which are connected to it through the telephone network.” EX1020, 142.

When HOST B wishes to stream video from HOST A over multiple interfaces at HOST B, it can send an initial request to HOST A for streaming using TCP/IP, such as an SYN packet. EX1045, 775. When such a TCP/IP request is sent, the packet will include a HOST B’s IP address as part of the TCP/IP tuple, which is the case will all TCP/IP communications. EX1045, 775; EX1001, ¶¶121. This IP address of HOST B will be the IP address of the interface that HOST B used to send that request, for example its 802.11 interface. EX1045, 775. This IP address is “first information associated with first network communication interface of the device.” Additionally, because the 802.11 interface can be used by HOST B to receive video from HOST A, the 802.11 interface “is capable of being used by the device to receive data packets.” EX1045, 773-775; EX1001, ¶¶121. Phatak also teaches that HOST B will notify HOST A of other IP addresses/interfaces where it can receive streaming data by using unused TCP/IP header fields. EX1045, 775 (“The first issue is how to make *A* and *B* aware of any multiple IP addresses the other may have. To accomplish this, IP and/or TCP headers and their processing would have to be modified. This is similar to the solution in SCTP which allows initialization chunks to list multiple addresses. While such modifications would interfere with interoperability and typically break ‘something else’, we believe that

using some more of the full header length allowed (by TCP, IPv4 and IPv6) and employing some of the unused fields is a fairly transparent solution.”).

*e. Limitation [8.d]*⁴

When HOST A is streaming video to HOST B’s 802.11 interface (“first network communication interface of the device”), for example, it will include the TCP/IP tuple session identifier. EX1001, ¶¶121, 123, As Phatak explains, this tuple uniquely identifies the communication session, and all data streams associated with the streaming session must contain the tuple. EX1045, 775 (“When the packet reaches its destination, *B*, it is not recognized as belonging to an established connection since a TCP connection is uniquely identified by the tuple (source IP address, source port, destination IP address, destination port).”).

f. Limitation [8.e]

When Host B is using an alternate interface to communicate with HOST A, such as interface B2 in Figure 1 which may be a cellular interface or an Ethernet interface for example, it will send packets to HOST A in IP-in-IP format, where the outer packet include interface B2 as the destination address, but encapsulates the original TCP/IP tuple from the primary connection via interface B1. EX1045,

⁴ Petitioner notes that there is no antecedent basis for “the multilink session identification” and submits that claim 8 is invalid for this additional reason.

775. This IP-in-IP packet comprises the “multilink session identification” because it includes the TCP/IP tuple based off of interface B1; it also includes “second information associated with a second network communication interface of the device that is capable of being used by the device to receive data packets” because it contains the address of interface B2, which can be used to received streamed packets from HOST A in addition to interface B1. *Id.*; see EX1001, ¶¶121.

g. Limitation [8.f]

Phatak teaches that packets can be sent from HOST A to HOST B such that packets are received on both interface B1 and B2, where all packets include the tuple session identifier. EX1045, 775 (“Note that the same tunneling mechanism can be used when *B* is accepting data on multiple interfaces. For instance, to send a packet through interfaces A_3 and B_2 , the original packet (having source and destination addresses $\text{Addr}(A_1)$ and $\text{Addr}(B_1)$ respectively) is encapsulated in a packet having source address $\text{Addr}(A_3)$ and destination address $\text{Addr}(B_2)$. The receiving IP stack at *B* strips the outer header, realizes that the inside packet is for an existing TCP connection, and transparently passes it to TCP.”).

Thus, when packets are being streamed from HOST A to interfaces B1 and B2 on HOST B, some packets will be sent to interface B1 and other packets will be sent to interface B2, but all packets will contain the TCP/IP tuple uniquely identifying the connection/session. EX1045, 775; see EX1001, ¶¶121.

2. Dependent Claim 9

Phatak explains that packets sent from HOST A to HOST B will contain the TC/IP tuple session ID, regardless of the interfaces on HOST B to which they are transmitted. Phatak further explains that the tuple is unique to a given communication session. EX1045, 775 (“When the packet reaches its destination, *B*, it is not recognized as belonging to an established connection since a TCP connection is uniquely identified by the tuple (source IP address, source port, destination IP address, destination port).”).

3. Dependent Claim 10

Kotzin discloses or renders obvious the additional limitations of claim 10.

a. Limitation [10.a]

Phatak is not limited to two interfaces. EX1045, 775 (showing three interfaces on HOST A as an example). Thus, HOST B can use three interfaces when communicating with HOST. When the third interface B3 is used to communicate with HOST A, the IP address of interface B3 will be included in the header of an IP-in-IP packet using Phatak’s tunneling mechanism. EX1045, 775. The IP address of interface B3 is therefore “multilink information associated with a third network communication interface of the device that is capable of being used by the device to receive data packets.”

b. Limitation [10.b]

When three different interfaces on HOST B are used to receive streaming data from HOST A, for example, HOST A will send different portions of the stream (groups of data packets) to the different interfaces on B. EX1045, 775.

4. Dependent Claim 11

Phatak explains that it is the job of a HOST to make known to another HOST the addresses of the various interfaces on which it can be sent data by using unused TCP/IP header fields. EX1045, 775 (“The first issue is how to make *A* and *B* aware of any multiple IP addresses the other may have. To accomplish this, IP and/or TCP headers and their processing would have to be modified. This is similar to the solution in SCTP which allows initialization chunks to list multiple addresses. While such modifications would interfere with interoperability and typically break ‘something else’, we believe that using some more of the full header length allowed (by TCP, IPv4 and IPv6) and employing some of the unused fields is a fairly transparent solution.”). A POSITA would have found it obvious that should one of HOST B’s interfaces become unavailable to receive data, it would fall to HOST B to notify the HOST A that that interface is no longer available. EX1001, ¶¶125.

5. Dependent Claim 12

In Phatak’s system, HOST A can use a single interface to communicate with multiple interfaces on HOST B. EX1045, 774 (describing use of single interface).

In that situation, when HOST B is using multiple interfaces to send data to HOST A, a POSITA would have understood and found obvious that such packets could be sent at different periods of time. EX1001, ¶126. Further, when a single interface is used as an endpoint on multiple links, a POSITA would have understood that packets would be received serially on that single interface, in the order that they are received at the interface. EX1001, ¶126. Because they are received serially, they are received at different periods of time. Thus, when a single interface on HOST A is receiving data from multiple interfaces on HOST B, those packets will be received by HOST A at different periods of time. EX1001, ¶126.

6. Claim 17

a. Preamble

Phatak discloses a “client device for multilink communication,” for example HOST B streaming video from HOST A on multiple interfaces, such as interfaces B1 and B2. *See* Section VII.B.1.a above.

b. Limitation [17.a]

Phatak discloses that different interfaces may have different bandwidths that can be aggregated to increase overall bandwidth. EX1045, 773 (“We then propose a new mechanism to aggregate the bandwidth of multiple IP links by splitting a data flow across multiple network interfaces at the IP level. Our method is transparent to transport (TCP/UDP) and higher layers. We have analyzed the performance characteristics of the aggregation scheme and demonstrated

significant gain when the links being aggregated have similar bandwidth and latency”; “Wireless bandwidth is a scarce resource which is unlikely to improve at the same pace as the rapid growth in bandwidth available via wired networks. Hence it is probable that mobile users will want to simultaneously stream data across multiple network interfaces in order to make use of all available bandwidth. Therefore, this paper investigates the simultaneous use of multiple network interfaces to enhance the overall bandwidth available to a wireless node.”). When interface B1 on HOST B is an 802.11 interface, for example, it is a “a first network interface having a first data transfer rate associated therewith.”

c. Limitation [17.b]

A second interface on HOST B, such as Bluetooth or Ethernet, will also have an associated bandwidth. EX1045, 775. Thus, when Interface B2 is Ethernet, it is “a second network interface having a second data transfer rate associated therewith.”

d. Limitation [17.c]

Phatak discloses that its HOSTs can be devices such as laptops and desktops that support TCP/IP. EX1045, 773, 775. A POSITA would have understood and found obvious that laptops and desktops are computers that are controlled by processors. *See* EX1001, ¶118.

e. Limitation [17.d]

When HOST B is streaming video from a website on HOST A, for example, HOST B will send an initial request packet through its primary interface B1, which is assumed to be an 802.11 interface for purposes of this discussion. As previously discussed, this request will contain the TCP/IP tuple, which uniquely identifies the session/connection. *See* Section VII.B.1.d above.

A POSITA would have further understood and found obvious that this request would contain a destination URL. The '908 specification broadly refers to the term "URL" as "a remote computer i.e. internet URL." EX1007, 12:3-4. Thus, as used in the '908 patent, the term "URL" includes the claimed server, which a POSITA would have understood and found obvious is identifiable by an address. As Dr. Lin explains, a POSITA would have understood that a message to a server on the Internet needs to be addressed in order to reach it over the Internet, and that message 508 needs to include the web address. EX1001, ¶¶128.

Additionally, as Dr. Lin explains, it would have been obvious to a POSITA to use the URL as an IP address, or alternatively also a domain name. EX1030, 200-01; EX1001, ¶¶128. Indeed, Phatak expressly contemplates communications over the Internet (EX1045, 773), and as Dr. Lin explains, HTTP is the protocol that is typically used by a client to communicate with Internet servers. EX1001, ¶¶97, 128; *see, e.g.*, EX1030 (TCP/IP For Dummies), 161. As such, a POSITA would

have understood that when the *client device* (HOST B) sends a HTTP request to the *server* (HOST A), it will include a *destination URL*. See EX1020 (Held), 765-66.

For the same reasons discussed in Section VII.A.1.b above with regard to Kotzin, which is incorporated herein by reference, a POSITA would also have been motivated to use HTTP and URLs as taught by Held with Phatak given Phatak's express teaching of communication with an Internet server. EX1001, ¶¶129.

f. Limitation [17.e]

As discussed above with regard to claim 8, when HOST B uses a second interface B2 to communicate with HOST A, it can send IP-in-IP encapsulated messages on B2 that contain the TCP/IP tuple for the primary connection over interface B1. Through this mechanism, HOST A is able to identify packets originating from different interfaces on HOST B as being part of the same session/connection. EX1045, 775. Additionally, a POSITA would have understood and found obvious that this message would include both a multilink session ID and URL, for the same reasons previously discussed with regard to the claimed "first message." See Section VII.B.6.e above.

g. Limitation [17.f]

When HOST B uses multiple interfaces to receive packets from HOST A, Phatak teaches that bandwidth will be increased via link aggregation when the two aggregated links have similar bandwidth and latency. EX1045, Abstract (“We have analyzed the performance characteristics of the aggregation scheme and demonstrated significant gain when the links being aggregated have similar bandwidth and latency.”). Phatak also teaches that streaming occurs concurrently on both interfaces. As Phatak explains, “this paper investigates the simultaneous use of multiple network interfaces to enhance the overall bandwidth available to a wireless node.” *Id.*, 773.

7. Dependent Claim 4

Claim 4 depends from independent claim 1, which is not separately challenged in this petition due to the pending *ex parte* reexamination. As discussed in Ground I, Claim 1 is essentially identical to claim 17, and is therefore obvious for the same reasons. The only substantive difference is claim 17’s use of “concurrently,” rendering claim 17 narrower than claim 1.

Claim 4 is also obvious. There is no antecedent basis for “first information” and “second information” in this claim, and Petitioner submits that this claim is invalid for that reason. Phatak explains, however, each of the different interfaces on HOST B would have its own IP address, and that those addresses must be

provided to HOST A so that HOST A can address packets to those interfaces. EX1045, 775.

8. Dependent Claim 7

Phatak discloses that its hosts can be laptops and desktops, which are “computers.” EX1045, 773, 775. Phatak also discloses that its hosts may have 802.11 interfaces, making them WiFi devices, or Bluetooth interfaces, making them Bluetooth devices. *Id.*, 773, 774, 775.

VIII. SECONDARY CONSIDERATIONS

Petitioner is unaware of any evidence of alleged secondary indicia that would support non-obviousness of the '908 patent, but to the extent Patent Owner subsequently presents such evidence, Petitioner respectfully requests the right to respond.

IX. MANDATORY NOTICES

As set forth below and pursuant to 37 C.F.R. § 42.8(a)(1), the following mandatory notices are provided as part of this Petition.

A. Real Party in Interest Under 37 C.F.R. § 42.8(b)(1)

Red Hat, Inc. is the real party in interest for Petitioner.

B. Related Matters

Red Hat has filed a complaint for declaratory judgment in *Red Hat, Inc. v. Competitive Access Systems, Inc.*, 5-24-cv-00505-D-BM. This case may affect, or be affected by, decisions in these proceedings.

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Pursuant to 37 C.F.R. § 42.8(b)(3), Petitioner provides the following designation of counsel:

Lead Counsel	Back-Up Counsel
Todd M. Friedman (Reg. No. 42,559) tfriedman@kirkland.com 601 Lexington Ave. New York, NY 10022 Phone: (212) 446-4786 Fax: (212) 446-4900	Yimeng Dou (Reg. No. 69,770) yimeng.dou@kirkland.com 695 Town Center Dr, Suite 1700 Costa Mesa, CA 92626 Phone: (213) 680-8283 Fax: (213) 680-8500 James Marina (Reg. No. 41,969) jmarina@kirkland.com 601 Lexington Ave. New York, NY 10022 Phone: (212) 446-4786 Fax: (212) 446-4900 Brandon H. Brown (to seek <i>pro hac</i> <i>vice</i> admission) bhbrown@kirkland.com 555 California Street, Suite 2700 San Francisco, CA 94104 Phone: (415) 439-1400 Fax: (415) 439-1500 W. Todd Baker (Reg. No. 45,265) todd.baker@kirkland.com 1301 Pennsylvania Ave., N.W. Washington, D.C. 20004 Phone: (202) 389-3135 Fax: (202) 389-5200

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Red Hat concurrently submits a Power of Attorney, 37 C.F.R. § 42.10(b), and consents to electronic service by email at Red_Hat_III@kirkland.com.

X. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

The undersigned authorizes the Office to charge the fee set forth in 37 C.F.R. § 42.15(a)(1) for this Petition to Deposit Account No. 506092, consistent with the requested review of claims 8-12, 17, 4 and 7, and any additional fees that may be due in connection with this Petition to be charged to the above-referenced deposit account.

XI. GROUNDS FOR STANDING UNDER 37 C.F.R. § 42.104(A)

Petitioner hereby certifies that the '908 patent is available for IPR and that the Petitioner is not barred or estopped from requesting IPR challenging the Challenged Claims on the grounds identified herein. Neither Petitioner, nor any party in privity with Petitioner: (i) has filed a civil action challenging the validity of the Challenged Claims; (ii) has been served a complaint alleging infringement of the '908 patent more than one year prior to the present date; or (iii) is estopped from challenging the claims on the grounds identified in the petition. The Challenged Claims also have not been the subject of a prior IPR or a finally concluded district court litigation.

XII. DISCRETIONARY DENIAL IS NOT APPROPRIATE

To the extent Patent Owner contends that discretionary denial is appropriate for any reason, Petitioner intends to oppose such arguments pursuant to the bifurcated briefing process set forth in the March 26, 2025 Stewart Memorandum.

XIII. CONCLUSION

Petitioner requests *inter partes* review of the challenged Claims; there is a reasonable likelihood that Petitioner will show that they are obvious.

Dated: August 1, 2025

Respectfully submitted,

/Todd M. Friedman/

Todd M. Friedman (Reg. No. 42,559)

Attorneys for Petitioner Red Hat, Inc.

CERTIFICATE OF COMPLIANCE

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 13,941 words. Counsel has relied upon the word count feature provided by Microsoft Word.

/Todd M. Friedman/

Todd M. Friedman (Reg. No. 42,559)

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing document with accompanying exhibits, as listed in Petitioner's Exhibit List, was served on August 1, 2025, via overnight delivery directed to the attorney/agent of record for the patent as identified on USPTO Patent Center at the following address:

K&L Gates LLP
70 West Madison Street, Suite 3300
Chicago, IL 60602

A courtesy copy was also served via electronic mail and FTP on the attorneys of record listed below for the following related matter:

Red Hat, Inc. v. Competitive Access Systems, Inc. Case No. 5:24-cv-505 (EDNC)

Gavin B. Parsons
N.C. State Bar I.D. No. 28013
Post Office Box 33009
Raleigh, NC 27636-3009
Email: gparsons@wardandsmith.com

B. Scott Eidson, #57757MO
Timothy D. Krieger, #57832MO
Julie C. Scheipeter, #65978MO
Zachary T. Buchheit, #71816MO
7700 Forsyth Blvd., Suite 1100
St. Louis, MO 63105
Email: scott.eidson@stinson.com
Email: tim.krieger@stinson.com
Email: Julie.scheipeter@stinson.com
Email: Zachary.buchheit@stinson.com

Adrianna M. Chavez, #035011AZ
1850 N. Central Ave., Suite 2100

Petition for *Inter Partes* Review of U.S. Patent No. 10,868,908

Phoenix, AZ 85004
Email: adrianna.chavez@stinson.com

Judith S. Araujo, #54102CO
1144 Fifteenth St., Suite 2400
Denver, CO 80202
Email: judith.araujo@stinson.com

/Todd M. Friedman/
Todd M. Friedman (Reg. No. 42,559)