

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC
Petitioner

v.

COMPETITIVE ACCESS SYSTEMS, INC.
Patent Owner

Case No. IPR2023-00584
U.S. Patent 10,868,908

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 10,868,908**

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APPENDIX OF EXHIBITS

Exhibit	Description
1001	U.S. Patent 10,868,908 (the “’908 Patent”)
1002	File History for U.S. Patent 10,868,908
1003	Declaration of James Geier (“Geier”)
1004	U.S. Patent 6,160,808 to Maurya (“Maurya”)
1005	International Publication WO 97/22212 to Low <i>et al.</i> (“Low”)
1006	U.S. Patent 5,809,070 to Krishnan <i>et al.</i> (“Krishnan”)
1007	U.S. Patent 7,606,156 to DeLangis (“DeLangis-156”)
1008	File History for U.S. Application 13/531,294
1009	U.S. Patent 8,861,349 (“’349 Patent”)
1010	Neil Briscoe, <i>Understanding the OSI 7-Layer Model</i> , PC Network Advisor Issue 120, pp. 13-14 (Jul. 2000) (“Briscoe”)
1011	John Day and Hubert Zimmerman, <i>The OSI Reference Model</i> , Proc. of the IEEE 71(12), 1334-1340 (Dec. 1983) (“Day”)
1012	W. Simpson, <i>The Point-to-Point Protocol</i> , Network Working Group, RFC 1661 (Jul. 1994), available at https://www.rfc-editor.org/rfc/rfc1661 (“Simpson”)
1013	U.S. Patent 6,112,245 to Araujo <i>et al.</i> (“Araujo”)
1014	U.S. Patent 5,774,660 to Brendel <i>et al.</i> (“Brendel”)
1015	K. Sklower, et al., <i>The PPP Multilink Protocol (MP)</i> , Network Working Group, RFC 1990 (Aug. 1996), available at https://www.rfc-editor.org/rfc/rfc1990.html (“Sklower”)
1016	U.S. Patent 7,315,900 to Ofelt <i>et al.</i> (“Ofelt”)
1017	Mel Beckman, <i>Integrated Services Digital Network Tutorial</i> , ARC Electronics (1995), available at https://arcelect.com/isdn.htm (“Beckman”)
1018	Lillian Goleniewski, Excerpt of <i>Telecommunications Essentials: The Complete Global Source for Communications Fundamentals, Data Networking and the Internet, and Next-Generation Networks</i> ,

Exhibit	Description
	Telecommunications Technology Fundamentals, Addison Wesley (Dec. 28, 2001), available at https://www.informit.com/articles/article.aspx?p=24687 (“Goleniewski”)
1019	Declaration of Kevin Jakel

I. INTRODUCTION

Petitioner Unified Patents, LLC (“Petitioner” or “Unified”) requests *inter partes* review (“IPR”) of claims 1–3, 5–6, and 13–15 of U.S. Patent 10,868,908 (the “’908 Patent,” **EX1001**), owned by Competitive Access Systems, Inc. (“CAS” or “PO”).

II. U.S. PATENT 10,868,908

A. Summary of the '908 Patent

The '908 Patent relates to a Residential Communications Gateway ("RCG").¹ The RCG is a stand-alone modem-like device that "combines the capabilities of IP routers, Class 5² circuit switches and wireless LANs" that is capable of providing additional services over a Plain Old Telephone Service (POTS) line. *'908 Patent* (EX1001), 2:36-40.³ The "primary function of the RCG is to provide a platform for Competitive Local Exchange Companies (CLECs) to compete with the Local Exchange Companies (LECs)." *Id.*, 1:21-24. Specifically, the RCG provides "new calling features and services over the existing POTS line" that are not offered by the LECs, without requiring new infrastructure (such as cable or DSL). *Id.*, 1:40-2:6.

In its "most basic usage," the RCG is plugged into POTS line and includes three line-output jacks to provide additional telephone lines into the household or office. *Id.*, 2:54-60; *see also* 2:48-53. Additional interfaces, such as a Universal Serial Bus (USB), Ethernet port, and 802.11b/g interface, are included for computer

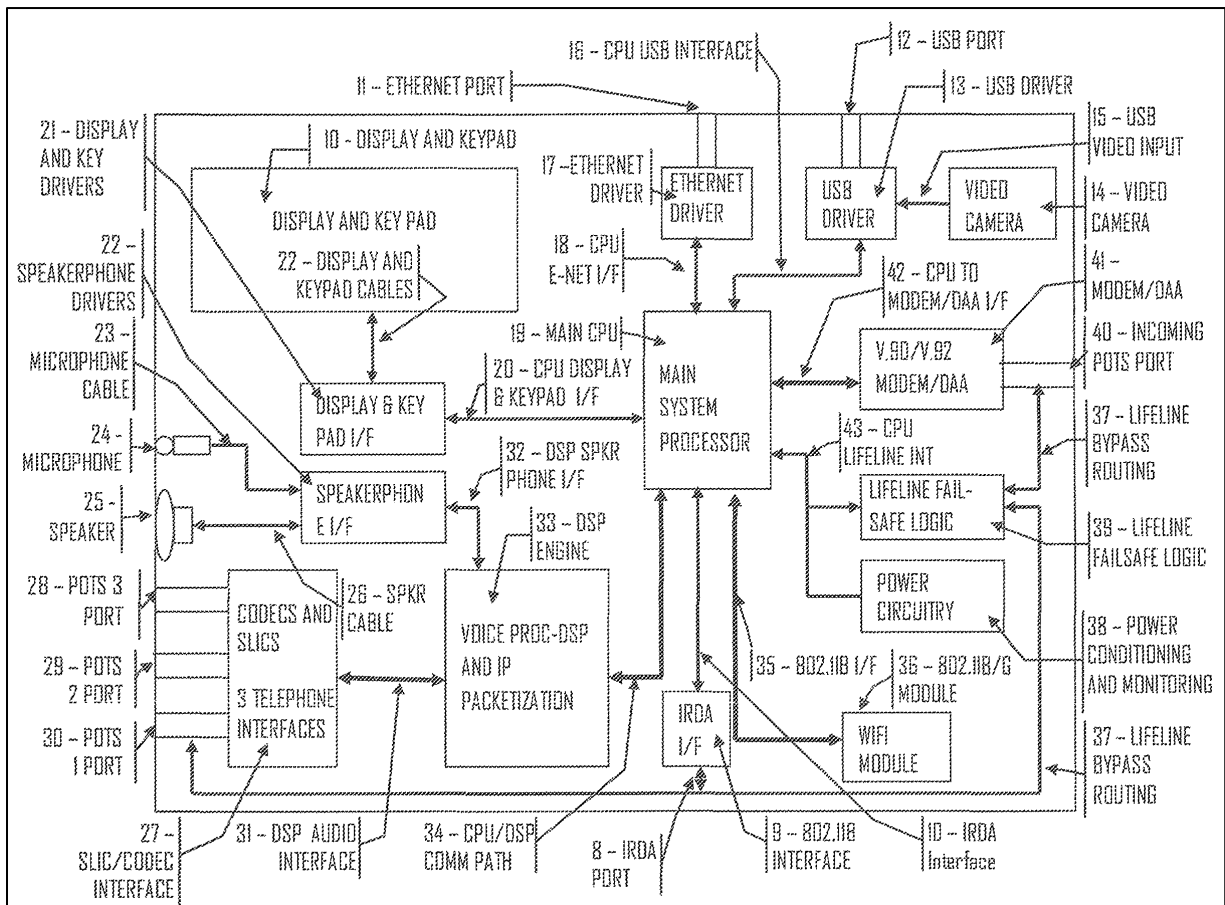
¹ The term "RCG" is not defined in the '908 Patent. It was defined in parent abstracts, but the abstract changed in the '908 Patent. *See, e.g.*, EX1007 (57).

² "Class 5" refers to a local exchange switch in, for example, an office building.

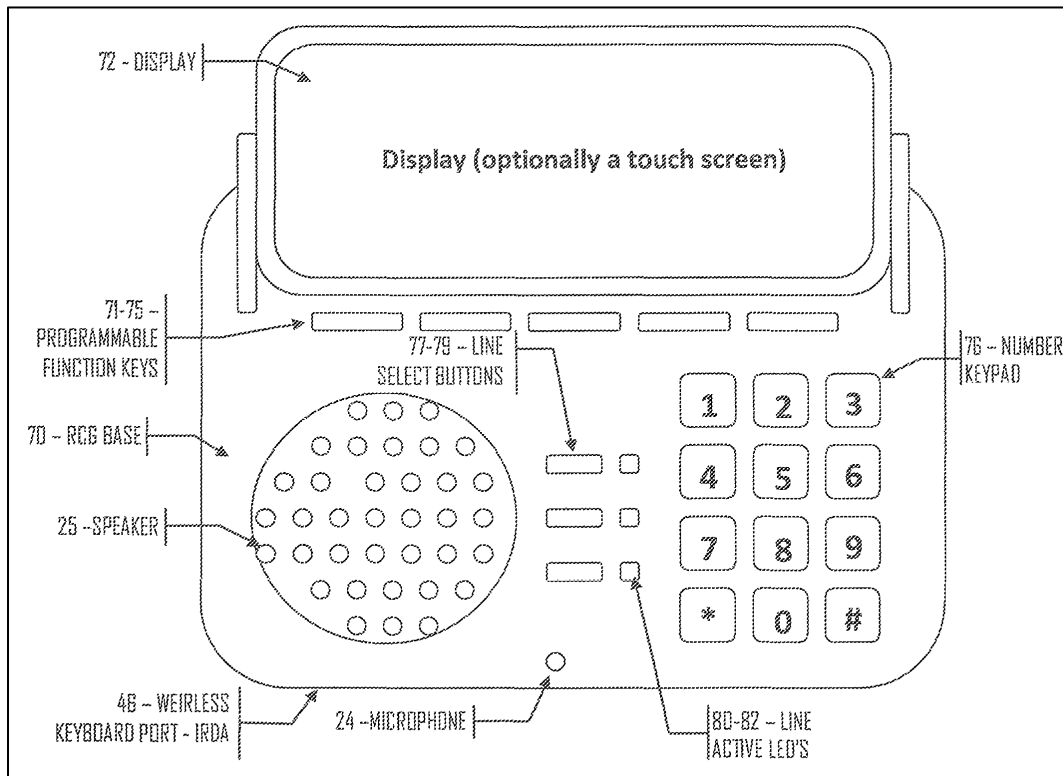
³ "POTS" is also not defined in the '908 Patent.

connectivity if data communications are desired. *Id.*, 2:60-3:1.

Figure 1 illustrates a preferred embodiment of the RCG, while Figure 4 shows a top view of the RCG:



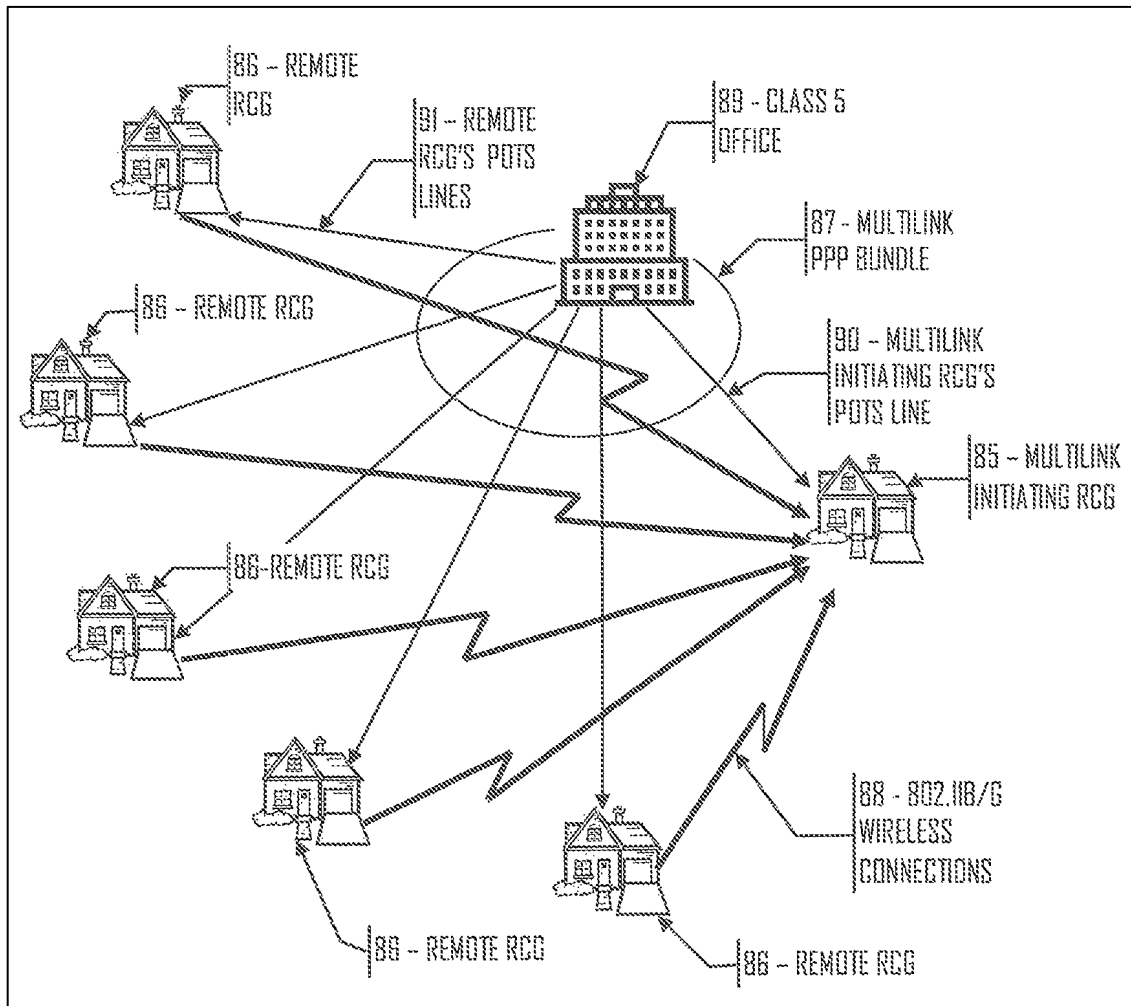
Id., Fig. 1.



Id., Fig. 4.

The RCG may communicate using the multilink point-to-point protocol, configured “per RFC 1990.” *Id.*, 11:25-28. The link is established by negotiating parameters with a “remote computer i.e. internet URL” (not shown) “via Link Control Protocol (LCP) session management.” *Id.*, 12:2-9; *see also* Fig. 7. During setup, the RCG receives a “multilink PPP session ID, or ‘magic number’” to identify the session and add or remove links from the bundle. *Id.*, 12:9-14. The RCG selects remote RCGs for transferring data based on a desired transfer bandwidth and the available bandwidth of other RCGs. *Id.*, 9:22-51. Each RCG represents a logical “link” in the initiating RCG’s multilink PPP bundle. *Id.*, 12:57-60. The initiating

RCG sends each remote RCG an initialization packet containing the session ID and the URL of the destination. *Id.*, 12:51-57. The remote RCGs send a multilink packet “to the destination URL” with the session ID and a request to be added to the bundle. *Id.*, 12:60-63.



Id., Fig. 7. Then, “the destination URL accepts the request of each of the remote RCGs” and sends data to each RCG. *Id.*, 12:63-66. The remote RCGs relay the data to the initiating RCG, which is responsible for reassembly. *Id.*, 12:66-13:7. Challenged independent claims 1 and 13, are directed to multilink communications.

B. Prosecution History

During prosecution, the original claims, reciting a “network edge device” for participating in “multipath” connections with a “data-requesting device,” (*File History* (**EX1002**), 46), were rejected as obvious. *Id.*, 56–58.

The next round of claims referred to a multipath connection including two network edge devices. *Id.*, 69. These were rejected as obvious. *Id.*, 83–85. The applicant made minor amendments and responded that the prior art did not disclose a “multipath connection” (*id.*, 93–98), but the examiner disagreed. *Id.*, 104.

The applicant next claimed a device for receiving data from a server over two communication interfaces and a processor aggregating the data received over the two interfaces. *Id.*, 126. The examiner issued a restriction requirement and withdrew the aggregating-data claim set. *Id.*, 139–141.

The applicant then amended the claims to match the claims that were not deemed withdrawn and added 13 new claims. *Id.*, 145–146. But the applicant still included two claim sets—claims for routing data, and claims for to “joining” or “assembling” data. *Id.*, 176–185. The examiner rejected the claims as not conforming to the written description requirement and as obvious. *Id.*, 197–206.

The applicant then cancelled claims 1–40 and proposed two new claim sets. The first set was directed to a client device including two or more network interfaces and a processor that (1) transmitted messages including an identifier unique to a

multilink session and information identifying one of the network interfaces for receiving data from both of the network interfaces and (2) received data through “any combination” of the two or more network interfaces. *Id.*, 243–244, 246–249. The second set was directed to a method for allocating bandwidth on a network including multiple remote gateways supporting a multilink connection. *Id.*, 250. The applicant identified the embodiments described in Figures 6–8 as providing written description support. *Id.*, 251. A restriction requirement was made, and the chosen claims, related to multilink communications, were rejected for lacking adequate written description support and as anticipated and/or obvious. *Id.*, 305–316.

The applicant amended some claims to recite that the message included a multilink request and a destination URL in a first message from a first network interface and a multilink session identification and destination URL in a second message from a second network interface in the client claims. *Id.*, 335. The amendments also added that the first and second network interfaces had different or separate data transfer rates and that the communication would provide “an increased data transfer rate” for the device receiving data. *Id.*, 335–337. The applicant cited written description support in the embodiment of Figure 7 and argued that it was “inherent in a ‘multilink PPP connection’” that an initiating RCG “receives data over multiple links ... thereby fulfilling one of the main purposes of the invention which is to increase data transfer rate for a particular device.” *Id.*, 343–44.

The examiner allowed some claims but rejected the argument that the prior art did not teach an increased data transfer rate. *Id.*, 350–351. The applicant amended the remaining claims to recite a multilink session identification, arguing that the prior art’s disclosure of a “multi-path identifier” was not the same. *Id.*, 373–74.

The remaining claims were allowed without a statement of a reasons for allowance. *Id.*, 380. It appears the claims were allowed based on the content of messages, namely the inclusion of a multilink session identification.

C. Priority

The ’908 patent was filed on September 15, 2016. The ’908 Patent purports to claim priority through a series of continuations to a provisional application filed on October 2, 2002.

The ’908 Patent is not entitled to the priority date of applications filed before October 11, 2014, when U.S. Patent 9,350,649 was filed, as the claims of the ’908 Patent lack adequate written description support from earlier applications. *See* Section IV.C.1, *infra*. Grounds 1 and 2 render the Challenged Claims obvious regardless of whether CAS can show priority to previous applications.

D. Level of Ordinary Skill in the Art

Petitioner assumes that a POSA would be a person having, at least by October 15, 2002: (1) at least an undergraduate degree in electrical engineering or closely related field, or similar advanced post-graduate education in this area; and (2) 2 or

more years of experience with communications systems, with more experience substituting for less education and vice versa. *Geier* (EX1003), ¶¶ 30–32. If a later priority date is applied, a POSA would have at least possessed as much knowledge and skill after 2002. *Id.*, ¶ 30.

E. Claim Construction

Petitioner proposes the below constructions based on the standards applied by Article III courts in post-grant proceedings. *See* 37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*).

1. the first message includes a multilink request a destination URL; the second message includes a multilink session identification the destination URL (Claim 1)

Claim 1 includes two limitations with missing conjunctions. Petitioner is unaware of an attempt by CAS to correct this error.

Petitioner has assumed that the missing conjunction is “and,” like similar limitations of claim 13. *Zoho Corp. v. RFID Tech. Innovations, LLC*, IPR2021-00448, Paper 4, 9–10 (PTAB Jul. 23, 2021) (DI, accepting Petitioner’s construction that a claim was meant to include the phrase “object and”). However, claim 1 would be obvious under either possible missing conjunction: *or* and *and*.⁴

⁴ Even if claim 1 is indefinite, the Board may evaluate obviousness. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813-14 (Fed. Cir. 2021).

III. REQUIREMENTS FOR *INTER PARTES REVIEW*

A. Standing

Petitioner certifies that the '908 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the Challenged Claims. 37 C.F.R. § 42.104(a).

B. Identification of Challenge and Requested Relief

In view of the prior art, evidence, and analysis discussed herein, Petitioner requests IPR of Claims 1–3, 5–6, and 13–15 of the '908 Patent under 35 U.S.C. § 103.⁵ 37 C.F.R. §§ 42.104(b)(1) and 42.22.

Grounds:

Ground	Claims	Challenge
1	1, 2, 5, 6	Obviousness over Maurya ⁶ and Low ⁷
2	1, 2, 5, 6, 13–15	Obviousness over Maurya, Krishnan, ⁸ and Low
3	1, 2, 5, 6	Obviousness over Maurya, Low, and DeLangis-156 ⁹

⁵ For grounds 1–2, either pre-AIA or AIA § 103, for grounds 3–4, AIA § 103.

⁶ U.S. Patent 6,160,808, **EX1004**.

⁷ International Publication WO 97/22212, **EX1005**.

⁸ U.S. Patent 5,809,070, **EX1006**.

⁹ U.S. Patent 7,606,156, **EX1007**

4	1–3, 5–6, 13–15	Obviousness over Maurya, Krishnan, Low, and DeLangis-156
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Section II, *supra*, proposes constructions for the Challenged Claims. 37 C.F.R. § 42.104(b)(3). Section IV, *infra*, identifies where each element of the Challenged Claims is found in the prior art. 37 C.F.R. § 42.104(b)(4). Numbers and descriptions of Exhibits 1001-1019 are provided above, and the relevance of the evidence to the challenges raised is provided in Section IV. 37 C.F.R. § 42.104(b)(5).

IV. GROUNDS OF UNPATENTABILITY

A. Ground 1: Claims 1, 2, 5, 6, and 13–15 are Obvious over Maurya and Low

1. *Overview of Maurya*

Maurya (EX1004) was filed on December 18, 1997 and issued on December 12, 2000. Maurya is prior art under post-AIA 35 USC § 102(a)(1)-(2) or pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

Maurya relates to communications techniques using the multilink point-to-point protocol (“ML-PPP”), also known as the multilink protocol (“MP”), in which packets of a common frame may be transmitted across and received from more than one link in a multi-link bundle. *Maurya* (EX1004), Abstract; *see also Geier* (EX1003), ¶ 36. Maurya provides an overview of the point-to-point protocol and one mechanism of implementation referred to as multilink. *Maurya* (EX1004), 3:1-7. Maurya discloses applying the multilink protocol to systems in which a given endpoint, such as a client device, is associated with multiple outgoing links:

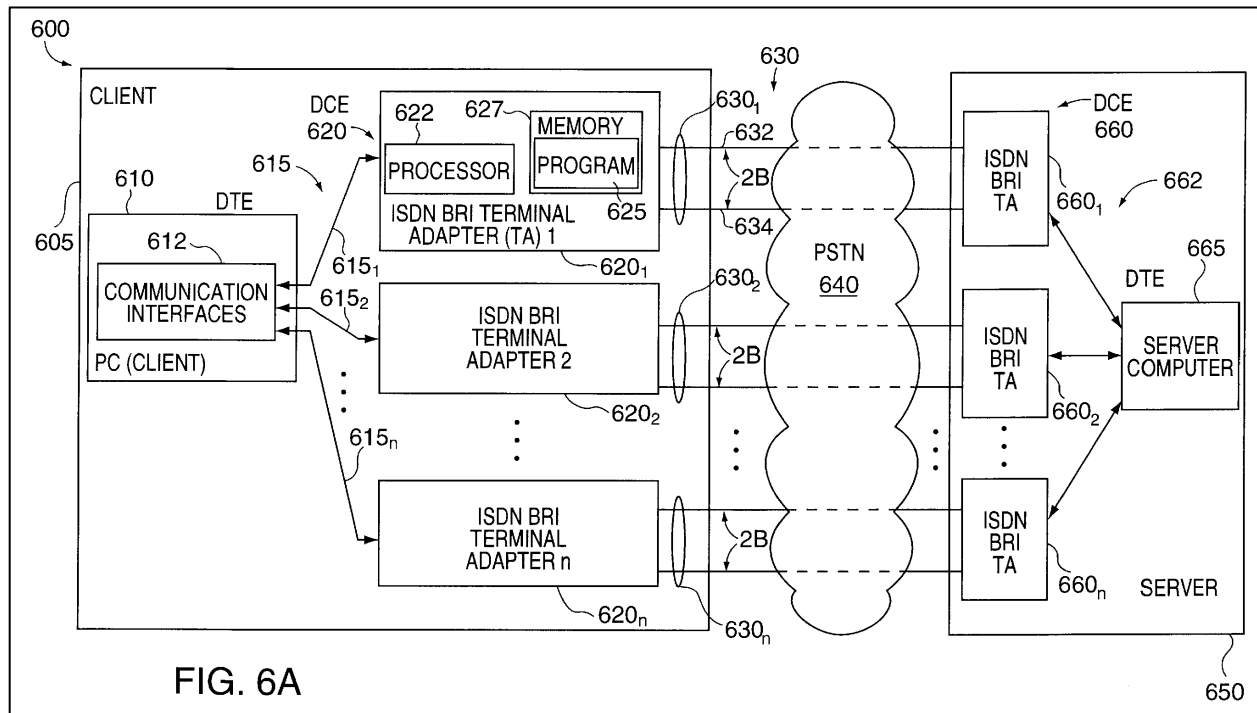


FIG. 6A

Id., Fig. 6; *see also* Abstract, 1:10-17.

Maurya uses certain terminology to refer to the various systems and components in a ML-PPP system. *Geier* (EX1003), ¶¶ 63–64. For example, a **peer** refers to a device that is (or seeks to be) part of the collection of devices exchanging data, including the client, server, and networking devices seeking to exchange data using the benefits of the multilink protocol. *Id.*, 5:29-37; *see also* 3:1-14. As examples, “peers” would have included terminal adapters, routers, or modems. *Geier* (EX1003), ¶ 64. A **link** refers to a physical layer, such as a communications channel, over which data is carried from a device. *Maurya* (EX1004), 1:10-14; *see also Geier* (EX1003), ¶ 64. A **bundle** refers to a collection of links conveying the data-carrying packets; for example, a computer and its terminal adapters. *Maurya* (EX1004), 3:1-

9. By using the multilink protocol, the entire collection of links forms a single **pipe**, which logically behaves as one channel between the client and server. *Id.*, 3:6-14.

Maurya is analogous art to the '908 Patent. *Geier* (EX1003), ¶ 73. It is within the field of endeavor of the '908 Patent, as it relates to techniques of communicating large amounts of between different devices, including in the context of the multi-link point-to-point protocol. *Maurya* (EX1004), 1:10-17. Additionally, it is reasonably pertinent to at least one problem concerning the inventors of the '908 Patent, namely, to provide higher level network services to more consumers, such as residential consumers, without severe infrastructure costs. '908 Patent (EX1001), 1:64-2:6; *see also Maurya* (EX1004), 4:52-55.

2. Overview of Low

Low (EX1005) was filed on December 11, 1996, designating the US, and published on June 19, 1997; thus, Low is prior art under post-AIA 35 USC § 102(a)(1) or pre-AIA 35 USC § 102(a), (b), and (e).

Low relates to providing resources supporting call-setup in a telephone system using servers connected to a computer network logically distinct from the telephone system infrastructure. *Low* (EX1005), Abstract. A given resource is locatable using a uniform resource identifier (URI) associated with a particular telephone number. *Id.* Low explains that it is a “cornerstone” of the World Wide Web to address information using a URI, generally either by a uniform resource locator (URL) or a

uniform resource name (URN) that can be resolved into a URL. *Id.*, 12:1-4.

Low is analogous art to the '908 Patent. *Geier* (EX1003), ¶ 86. Low is within the field of endeavor of the '908 Patent because it relates to methods of accessing resources through a switched telecommunications system, including using the point-to-point protocol to allow users to communicate with an internet service provider (ISP) via a public telephone system. *Low* (EX1005), 1:7-9; *see also* 11:21-26, 46:23-27. Low is also reasonably pertinent to one problem concerning the inventors of the '908 Patent, such as the ability to provide users with communication and data services not provided by local exchange companies. '908 Patent (EX1001), 1:67-2:6. For example, Low discloses that its invention provides enhanced services to a user through different types of communications systems to provide a more “synergistic relationship” between the world of telephone networks and internet-based information services. *Low* (EX1005), 2:1-16.

3. *Claim 1*

[1P]. A client device for multilink data packet communication with a server, the client device comprising:

Preambles are “generally not limiting,” and it should not be considered so here. *Symantec Corp. v. Computer Assoc. Intern.*, 522 F.3d 1279 (Fed. Cir. 2008) (quoting *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)). The body of claim 1 provides a structurally complete invention, while

the preamble simply provides the context of a client-server architecture. *Id.*, 522 F.3d at 1289. Assuming *arguendo* that it is limiting, the preamble is taught by, or at least obvious over, Maurya.

Maurya discloses *a client device for multi-link data packet communications with a server* (e.g., a client 605, including a PC 610 executing a client application, in communication with a server 650 using multi-link point-to-point (PPP) protocols). *Maurya* (EX1004), Abstract (“A communications technique which permits **incoming multi-link point-to-point (PPP) packets of a common PPP frame to be simultaneously transmitted** across more than one outgoing link”).¹⁰ Specifically, a client is in communication with a server via multiple basic rate interfaces (“BRI”) implementing the multilink protocol:

¹⁰ Unless otherwise indicated, **bold** emphases in quotations have been added, and *italics* denote claim language.

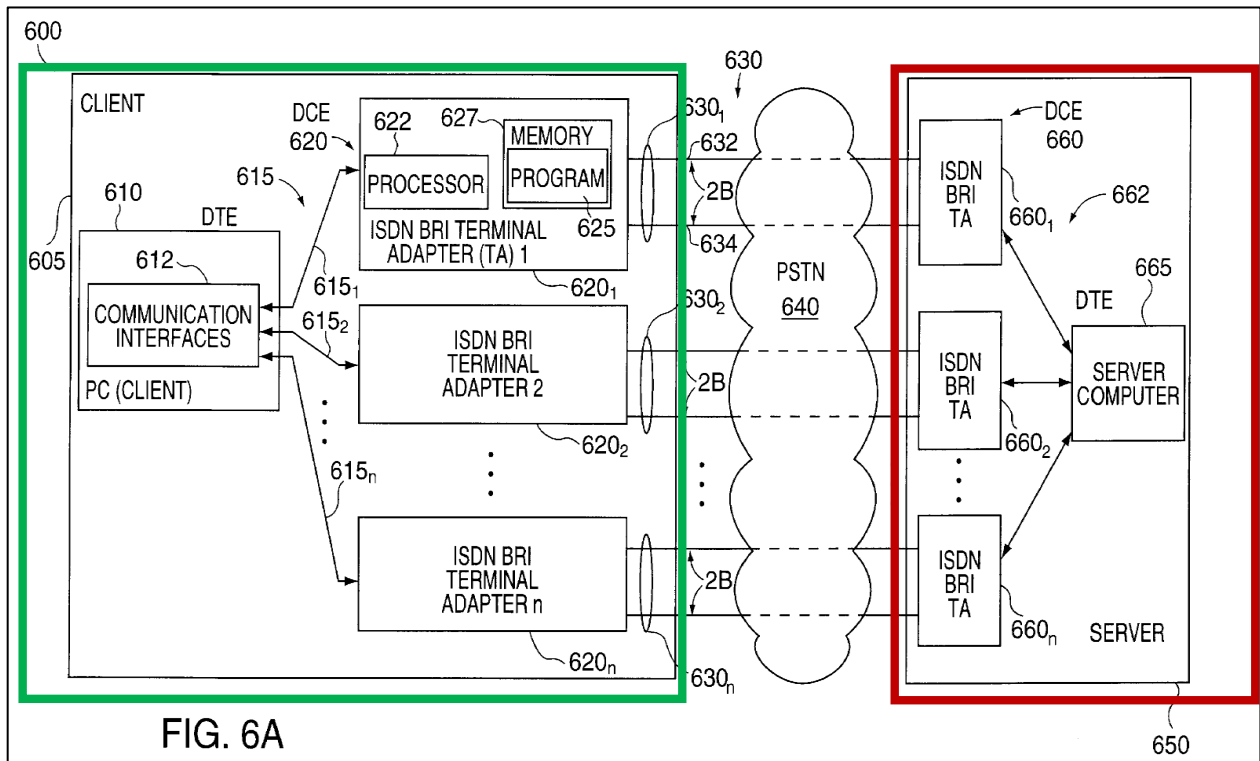


FIG. 6A

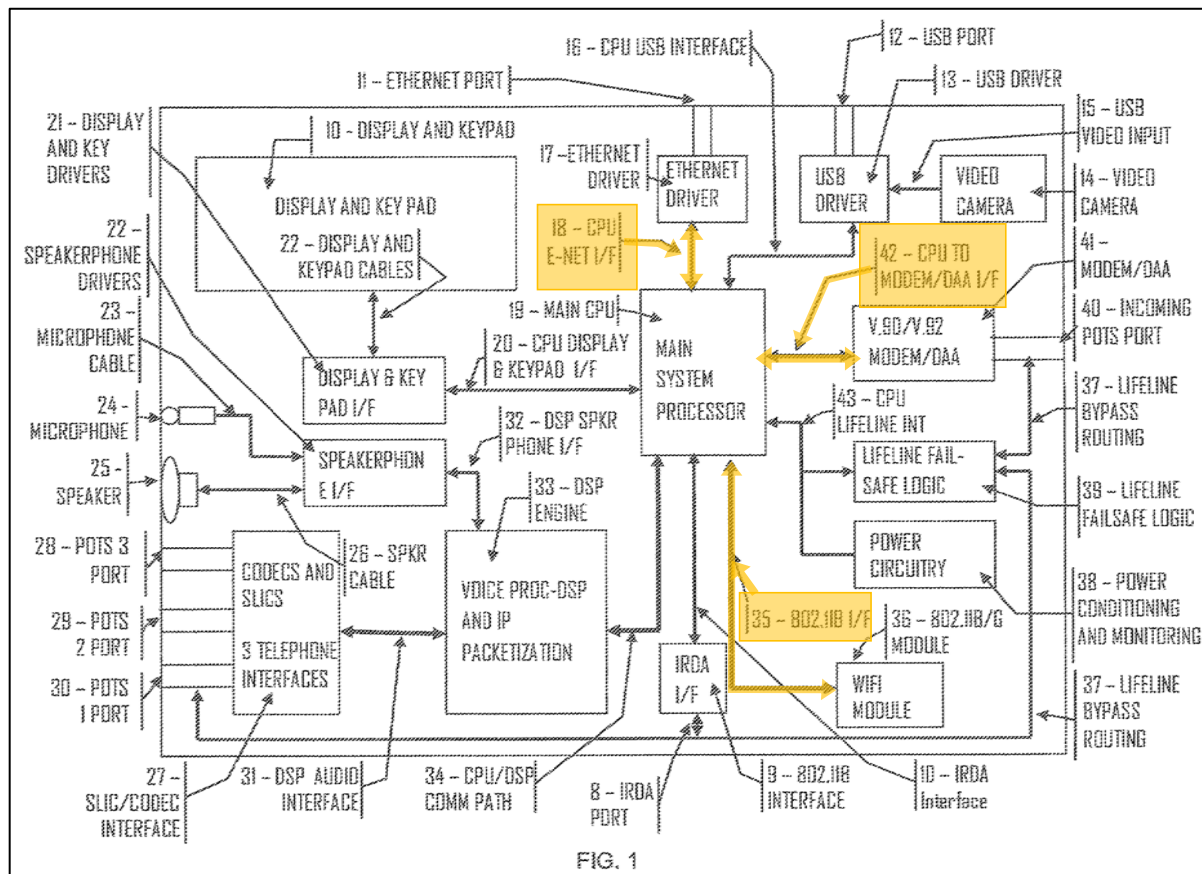
Id., Fig. 6A; *see also* 11:40-45 (“**Client 605** is formed of client PC 610 . . . connected, through internal communication interfaces 612, typically separate serial ports (not specifically identified), and via corresponding links 615, to multiple identical ISDN BRI terminal adapters 620 as DCE (data circuit terminating equipment)”); 11:45-49 (“[L]inks 615 ... connect separate terminal adapters ... to separate corresponding serial ports provided by communication interfaces 612”).

[1.1]. a first network interface having a first data transfer rate associated with a first path from the server to the first network interface of the client device;

Maurya teaches, or at least renders obvious, this limitation. Specifically, Maurya discloses a client having *a first network interface* (e.g., a **communication interface** corresponding to link 615₁, which is connected to a terminal adapter 620₁)

with a first path from the server to the first network interface of the client device (e.g., channel 630₁).

The '908 Patent uses the word *interface* (I/F) broadly, referring to each of the link between a main processor and the network device, such as a WiFi module or ethernet driver (see Fig. 1, annotated), ports, or to the network devices themselves:



'908 Patent (EX1001), Fig. 1 (annotated; uses I/F to refer to the link between a main processor and drivers/modules); 2:61-65 (referring to ethernet, USB, or firewire ports as “interfaces for computer connectivity”); 3:65-3:10 (the CPU includes ports, modems/DAA for routing data and an 802.11b/g modules); see also, Fig. 6.

Similarly, Maurya discloses that a given client is “interconnected to the server” through multiple ISDN basic rate interfaces (or “BRI”). *Maurya* (EX1004), 11:34-39. The client computer includes internal **communication interfaces 612**, which are connected via corresponding **links 615_n** to multiple ISDN terminal **adapters 620_n**. *Id.*, 11:40-49. These terminal adapters each have a data transfer rate *associated with* corresponding links 630_n to the server (each a *first path from the server to the first network interface of the client device*):

Client 605 is formed of client PC 610, as DTE (data terminating equipment), connected, through **internal communication interfaces 612**, typically separate serial ports (not specifically identified), and via corresponding links 615, to multiple identical ISDN BRI terminal adapters 620 as DCE (data circuit terminating equipment). In that regard, links 615, which comprise links 615₁ , 615₂ , ... , 615_n connect separate terminal adapters 620₁ , 620₂ , ... , 620_n, respectively, to separate corresponding serial ports provided by communication interfaces 612. . . . **All these terminal adapters are collectively connected to one end of ISDN BRI lines 630**, with each terminal adapter 620₁, 620₂, ... , 620_n, being individually connected to a pair of lines for two ISDN B channels, specifically lines 630₁ (having a separate pair of links 632 and 634 for pair of B channels), 630₂, ... , 630_n, respectively.

Id., 11:40-67 (each ISDN BRI connection also entails a separate ISDN data ("D") channel connection).

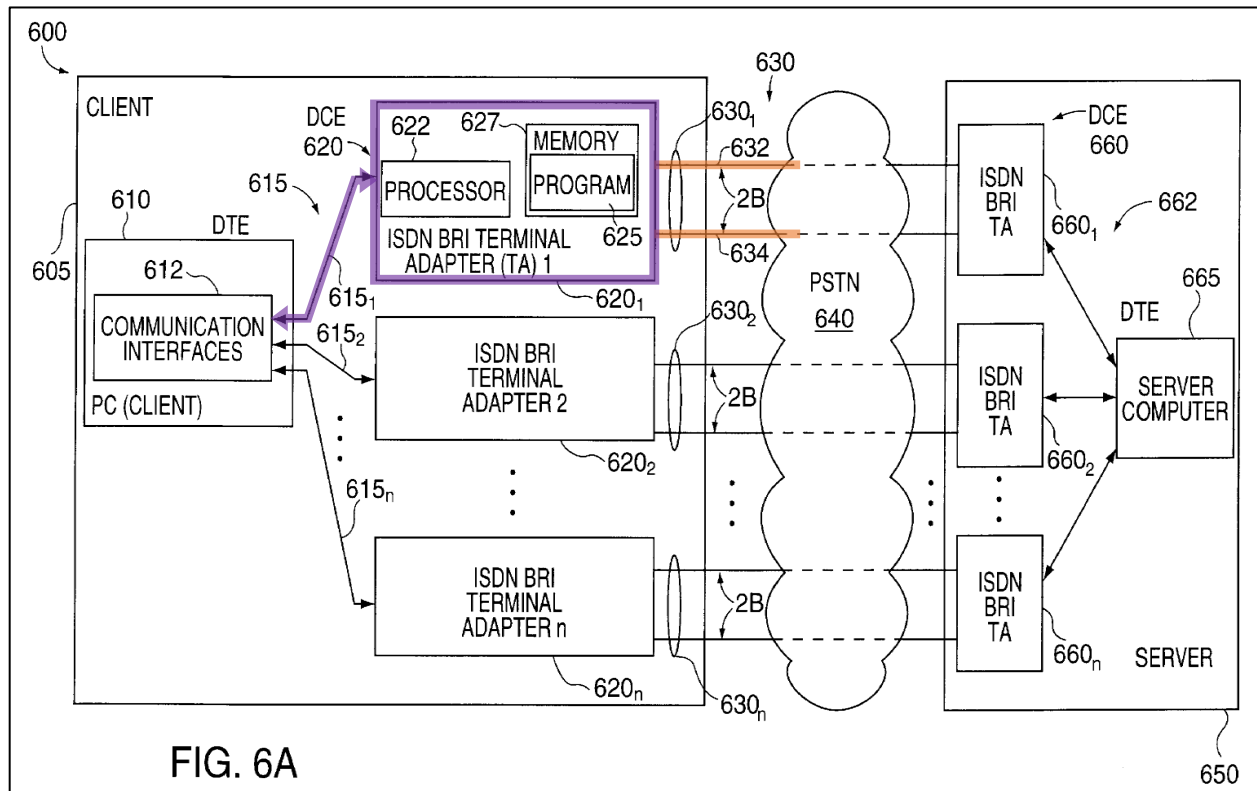


FIG. 6A

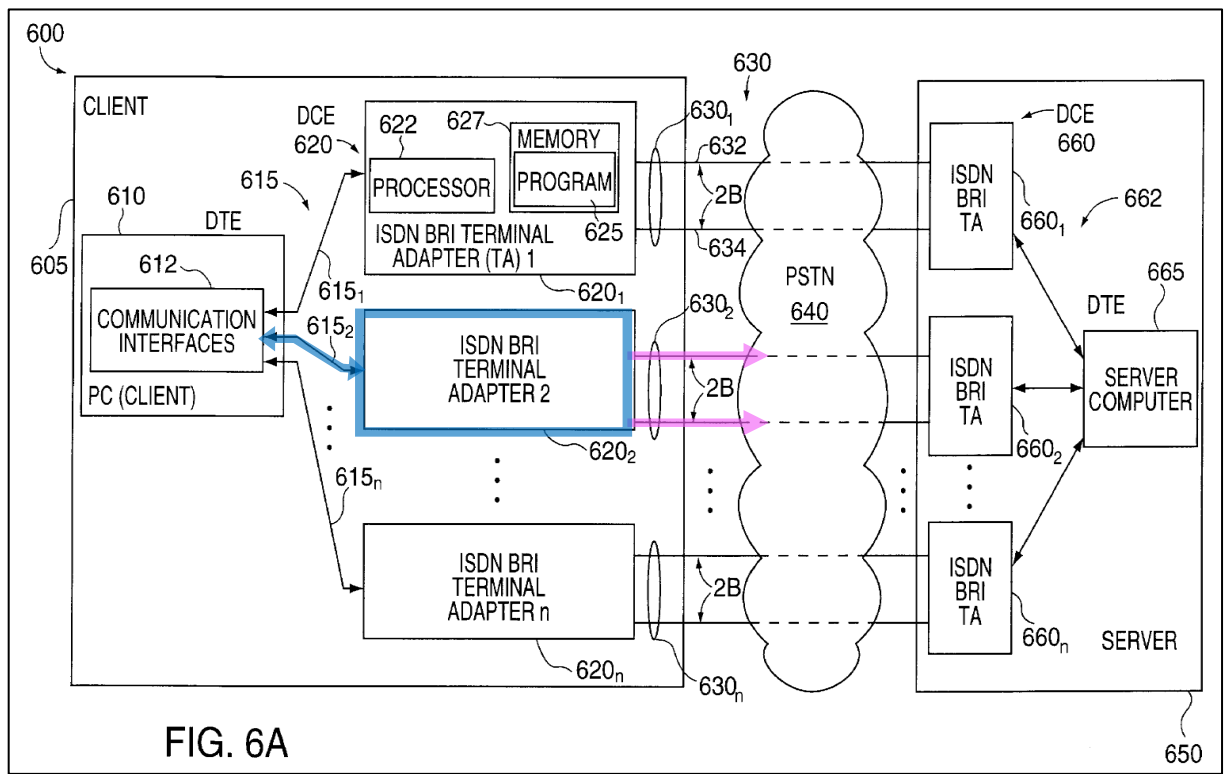
Id., Fig. 6A (annotated). The communication interfaces are “typically . . . separate serial ports” and “not specifically identified.” *Id.*, 11:42-43. These *network interfaces* correspond to **first link 615₁, with adapter 620₁** and they have a data transfer rate associated with **links 630₁**, corresponding to the **first path** from the server to first network interface of the client device.

Each of Maurya’s network interfaces has a *data transfer rate associated with* their respective *paths* 630 to the server. *Id.* 17:36-38 (discussing the “data transmission rate, such as two **B-channels** in an ISDN line”); *see also* Fig. 6A (labeling channels 630₁ . . . 630_n as 2B channels); 11:40-67. Additionally, Maurya recognizes that the different devices communicating along a path may, but need not,

have the same data transmission rate. *Id.*, 17:36-57 (describing packet encapsulation when the same data transmission rate cannot be guaranteed across different links).

[1.2] a second network interface having a second data transfer rate associated with a second path from the server to the second network interface of the client device; and

Maurya teaches, or at least renders obvious, this limitation. Specifically, Maurya discloses a client 605 having a **second network interface** (e.g., a **communication interface** corresponding to link 615₂ to a terminal adapter 620₂) having a **second data transfer rate associated with a second path** from the server to the first network interface of the client device (e.g., link 630₂ to terminal adapter 660₂ of server 650):



Maurya (EX1004), Fig. 6A (annotated); *see also* 11:40-67, 17:36-57.

[1.3]. at least one processor configured to:

Maurya teaches, or at least renders obvious, this limitation. **Client PC 610** is a computer, which were known to function using a processor, such as a central processing unit. *Geier* (EX1003), ¶ 72. Maurya also discloses that a client device may be the “multi-link PPP originator” that employs a “**client application executing at a PC**” to assign itself a unique endpoint discriminator value and “inform[] all its immediate PPP peers, such as neighboring terminal adapters” of this value using a particular kind of LCP packet. *Maurya* (EX1004), 13:61-14:5; *see also* 5:29-37, 14:22-39. Thus, a POSA would have recognized based on Maurya’s disclosure that the client PC 610 executes a client application during the course of configuring a link, that Maurya’s client PC would have typically, if not inherently, included a processor to send out the LCP messages required for client 605 to interface with server 650. *Geier* (EX1003), ¶ 72 (citing e.g., *Maurya*, 14:22-27).

[1.3.1]. transmit a first message through the first network interface to the server, wherein the first message includes a multilink request [sic] a destination URL;

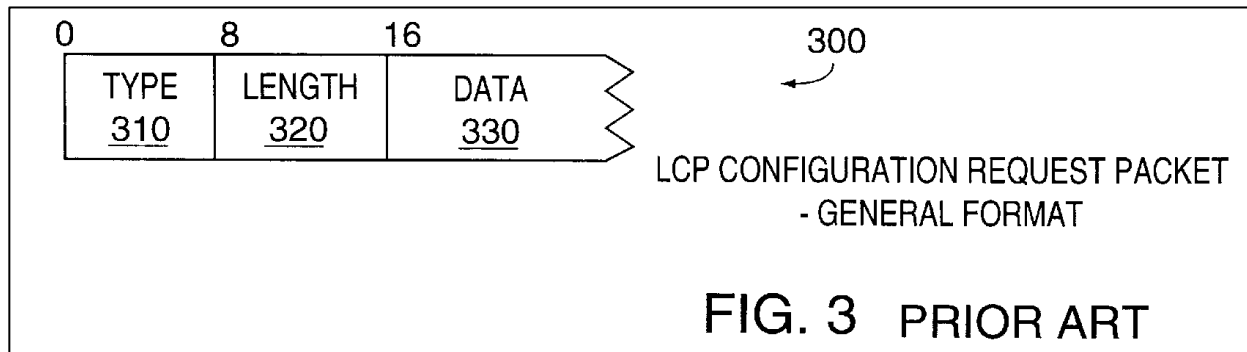
This limitation is obvious over the combination of Maurya and Low. Maurya discloses that links are configured using link control protocol (“LCP”) packets under the point-to-point protocol. To set up a link for the multilink protocol, a client sends an LCP configuration request packet that includes a “Type” field, which is used to

indicate a multilink configuration (i.e., *a multilink request*). Combined with Low, the packet would include a *destination URL* to reach the appropriate destination at the server, as Low teaches.

Maurya discloses that in the conventional PPP context, each peer, which includes each network device of the client, would transmit an LCP “**Configure Request**” to configure a link, establish a connection, add and remove connections, and test the link:

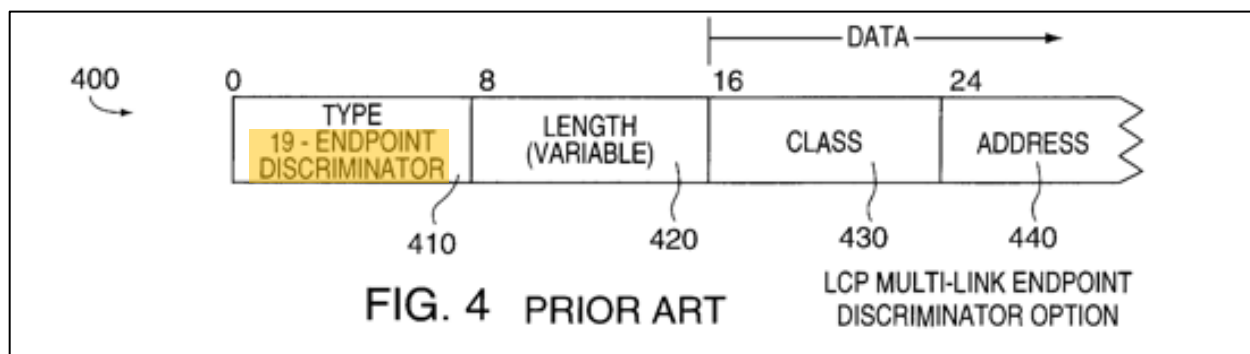
Initially, as shown, a link is in Dead state 110, during which the PPP protocol is inactive. . . . **[A] link control protocol (LCP), which as part of the PPP protocol, exercises responsibility for establishing and configuring the link**, remains in an initial or starting state. Once the physical layer has appropriately signaled that the link is ready, then the link transitions, as symbolized by UP line 115, to Establish state 120.

Maurya (EX1004), 7:22-37; *see also* 1:52-55 (“Before any data is transmitted over a PPP link, **each PPP peer connected to one end of the link will send LCP configuration packets to the other end to establish and test the link**; thus, ensuring the link is fully operational.”); *see also Geier* (EX1003), ¶¶ 49, 55 (noting other LCP packets). Figure 3 illustrates a general format for an LCP configuration request packet for initializing a link:



Maurya (EX1004), Fig. 3.

The “**Type**” field is how the peers signal that the link is to be configured according to the multi-link protocol (i.e., *as a multilink request*). *Id.*, 8:60-9:9 (type codes 17, 18 and 19 “designate a multi-link MRRU (Multi-link Maximum Receive Reconstructed unit) request, a multi-link Short Sequence Number header request and a ‘multi-link endpoint discriminator’ option, respectively”). *Maurya* teaches using type field is 19, signaling a particular kind of **multilink** configuration request, the endpoint discriminator option:



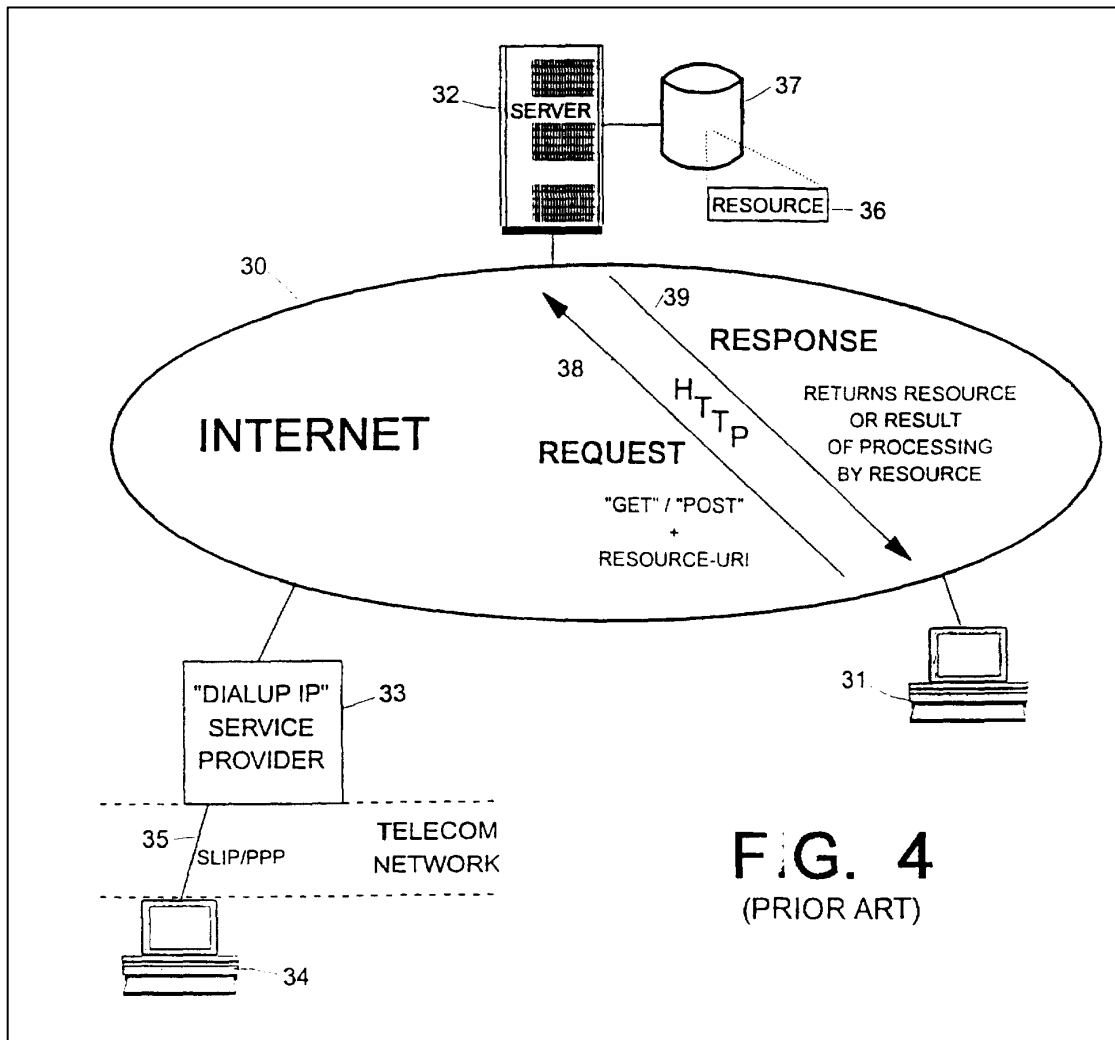
See id., 9:35-38, Fig. 4 (annotated); *see also* 9:14-21.

A POSA would have recognized from *Maurya*’s disclosure that messages to the server would include information for addressing a server resource, such as the

destination URL taught by Low. *Geier* (EX1003), ¶¶ 87–88. Maurya describes accessing HTML links to visit websites via a web browser (*Maurya* (EX1004), 1:65–2:25), but because its invention relates to specific fields of LCP configuration packets, it does not go into detail regarding other information that would be included in the message. *Geier* (EX1003), ¶¶ 87–88; *see also* ¶¶ 40–48 (describing how the packaging of data is modeled in a communications system, with a data-link layer operating after the application, transport, and network layers from the perspective of a sender). Such other information would include information for identifying the server resource. *Id.*, ¶ 88; *see also* ¶¶ 48, 50–52 (explaining how LCP packets operate at the data link layer and would include information compiled by “upper” layers of communication, such as the network/transport and application layers). Low explains that resources available over the world wide web were accessible via uniform resource locators, or *URLs*:

A cornerstone of the WWW is its ability to address particular information resources by means of an [*sic*] Uniform Resource Identifier (URI) that will generally be either a Uniform Resource Locator (URL) that identifies a resource by location, or a Uniform Resource Name (URN) that can be resolved into an URL.

Low (EX1005), 12:1–4; *see also* 18:6–7 (“where URIs are referred to in [Low’s disclosure] these URIs are URLs and/or URNs.”). Low discloses that request to a server would typically include a resource URI, such as a URL:



Id., Fig. 4; *see also* Fig. 8, 23:17-21 (resource code for requesting a service resource includes a URI identifier and a relative resource identifier).

A POSA would have been motivated to incorporate Low's teachings regarding communications between a client and a web server because such would have been a matter of combining prior art elements (e.g., the contents of packets, as disclosed by Maurya and Low) according to known methods (e.g., using the known multilink protocol) to yield predictable results. *Geier* (EX1003), ¶ 87. As a POSA

would have known, LCP packets operate at the data link layer, and the data link layer encapsulates information identified by higher communication layers, such as a destination URL requested by a client executing a web browser application. *Id.*, ¶¶ 51–52; *see also* ¶ 42 (in telecommunications, the data link layer provides the functional and procedural means for data transfer). Low simply provides additional context that Maurya lacks regarding what happens when a user clicks on a link on a web browser. *Id.*, ¶ 88.

For example, Maurya describes in its background how users click “on a hypertext link or otherwise selects a web page” to access HTML resources at “a remote web server “through an Internet connection,” (*Maurya* (EX1004), 2:9-15), but because its invention is directed to specific fields of the LCP configuration packet, it does not go into detail regarding other information that may be included in the overall message, such as information for identifying the server resource. *Geier* (EX1003), ¶ 88. Low provides these implementation details for a resource on a web server. *Low* (EX1005), 13:24-25 (generally describing accessing HTML resources over a web browser). Namely, Low identifies two ways to identify a unique resource: by including a URL or by a uniform resource name (URN) that can be resolved into a URL. *Low* (EX1005), 12:1-4; 18:6-7; *see also Geier* (EX1003), ¶ 88. Thus, a POSA would have been motivated to incorporate Low’s teachings regarding using a *destination URL* in messages sent from the client 605 to the server 650 when

configuring a link in Maurya's system. *Geier* (EX1003), ¶ 88.

Further, a POSA would have had a reasonable expectation of success in making the combination because the prior art describes similar data link protocols for accessing web server resources, and the combination therefore merely involves at most minor modifications in software using known communication techniques. *Geier* (EX1003), ¶ 89. Low confirms that the use of URLs was known for user terminals and internet service providers employing the point-to-point protocol (PPP) to communicate packets. *Low* (EX1005), 11:21-30 (serial line interface protocol and point-to-point protocol “allow Internet packets to traverse ordinary telephone lines”); *see also* 46:23-27; 18:6-7, Fig. 6. Low also contemplates its own system using the PPP over multiple channels, including using ISDN lines. *Id.* 42:7-12 (noting that the use of ISDN lines, used in Maurya's preferred embodiments, would allow the use of PPP over multiple channels, thus not tying up an ordinary telephone line). As a POSA would have known, and as Maurya confirms, ML-PPP was simply a particular mechanism, or application, of PPP. *Maurya* (EX1004), 3:1-8; *see also* *Geier* (EX1003), ¶ 89.

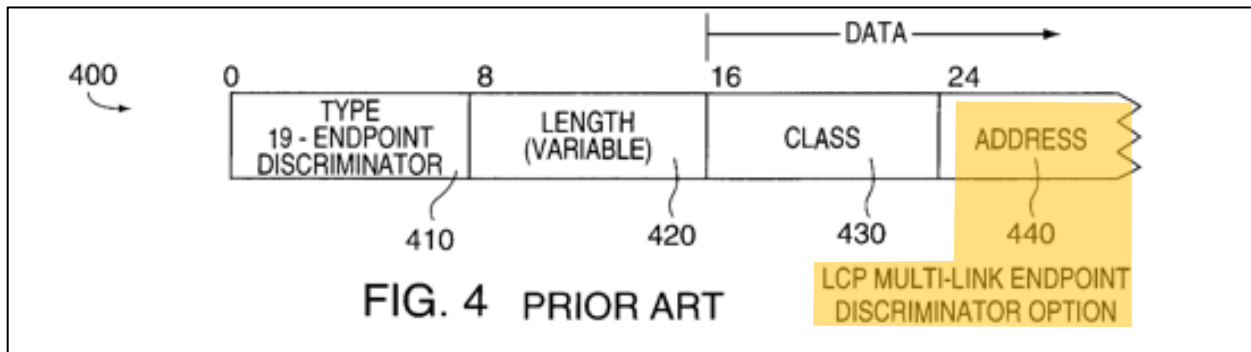
[1.3.2] transmit a second message through the second network interface to the server, wherein the second message includes a multilink session identification [sic] the destination URL; and

This limitation is obvious over the combination of Maurya and Low. Specifically, Maurya that the client PC requires **each peer** to send the client's unique

endpoint discriminator, or endpoint identifier (i.e., *multilink session identification*) when initiating a link. *Maurya* (EX1004), 9:14-34 (describing the multi-link endpoint discriminator option LCP Configuration Request packet); 1:52-55 (each PPP peer sends LCP packets to the other end of the link to ensure it is fully operational). Thus, an application executing at the client PC 610 requires terminal adapter 620₂ to send a *second message* to the server including a *multilink session identification*. As combined with Low, this second message would also include a *destination URL*.

As discussed regarding limitation 1.3.1, an endpoint discriminator option allows different peers, such as the terminal adapters, to join a link by specifying an endpoint discriminator of an endpoint system:

[A]n LCP Configure Request packet 35 specifies a multi-link endpoint discriminator option whenever the type field of the LCP Configure Request packet is set to value nineteen, as is field 410. **Identification of the endpoint system (commonly referred to as either an “endpoint discriminator” or “endpoint identifier”) is accomplished through class field 430 and address field 440, which collectively contain data carried by this packet.**



Maurya (EX1004), 9:35-42, Fig. 4 (annotated); 1:52-55 (“Before any data is transmitted over a PPP link, **each PPP peer connected to one end of the link will send LCP configuration packets to the other end to establish and test the link.**”). Endpoint discriminators were used to determine if a link is part of an existing bundle of links connecting these peers or if a new bundle should be established. *Id.*, 9:25-31; *see also* 10:22-29.

Maurya discloses that a unique endpoint discriminator may be assigned to all peers. *Maurya* explains that one drawback to conventional PPP systems is that multiple outgoing links connected to the same endpoint system, such as a client, still may have different endpoint discriminators; this results in the endpoint system at the opposite end of the pipe, such as a server, as viewing each network device as separate instead of as part of a common bundle of links terminating at one system, resulting in packets not being properly reassembled at the client PC. *Id.*, 13:23-46.

Maurya purports to solve this problem by creating a “multi-multi” link protocol in which a client directs each peer at the end of one pipe to “share a common

endpoint discriminator value.” *Id.*, 13:54-60. This is performed during LCP negotiations by having “a multilink PPP originator, such as . . . a client application executing at a PC, assign[] itself a unique endpoint discriminator value and inform[] all its immediate PPP peers” of this value using an LCP Endpoint Discriminator packet containing this value.” Each peer assumes this unique value as its own endpoint discriminator value and passes it through LCP packets down the pipe, fanning out until “all the links in this pipe will be viewed, by the multi-link protocol, as part of a common bundle.” *Id.*, 14:5-21; *see also* 5:8-20, 5:29-55 (similar).

For example, a client PC 610 assigns itself a unique endpoint discriminator, which it supplies to each of the terminal adapters 620 to set as their own endpoint discriminator. *Id.*, 14:22-29; *see also* 14:35-37. When each of these terminal adapters of client 605 configure the link with each of the corresponding the adapters 660 at the server end of the pipe, they will provide this common endpoint discriminator via the LCP Configuration Request packet. *Id.*, 14:35-43; *see also* Fig. 6B. Then, “by virtue of the common endpoint discriminator associated [*sic*] the application executing at client PC 10,” the server will see all of the peers as part of a common bundle for packets generated by and destined to client 605. *Id.*, 14:50-60.

A POSA would have recognized that Maurya’s endpoint discriminator, also called an endpoint identifier (*id.*, 9:39-40, 10:22-25, 13:19-21), is a *multilink session identification* because it identifies the session using LCP configuration packets,

which were used to add and remove devices from a link. *Geier* (EX1003), ¶¶ 74–75. Indeed, one example of multilink session identification in the '908 Patent is a “magic number.” '908 Patent (EX1001), 12:9-14. It was well known that “magic number” was a class, or form, of endpoint discriminators, indicated using the number 4 in class field 430 of the endpoint discriminator packet of Figure 4. *Maurya* (EX1004), 9:42-44; *see also Geier* (EX1003), ¶ 76; *see also* ¶¶ 57–58 (citing RFC 1990, EX1015).¹¹

Finally, for the reasons discussed regarding limitation 1.3.1, *supra*, a POSA would have been motivated to, and would have had a reasonable expectation of success in modifying *Maurya* in light of Low’s disclosure to include a *destination URL* with LCP packets transferred from the client to the server. *Maurya* (EX1004), 1:65-2:25; *see also Low* (EX1005), 12:1-4; *Geier* (EX1003), ¶¶ 87–89.

[1.3.3] receive data packets from the server through the first and second network interfaces of the client device during the multilink session

Maurya teaches or at least renders obvious this limitation. *Maurya* confirms

¹¹ *Maurya* states that its system functions “equally well” with any class of endpoint discriminator. *Maurya* (EX1004), 9:49-55. Thus, to the extent CAS argues that *multilink session identification* is limited to magic numbers, such would still be obvious over *Maurya* in view of the knowledge of a POSA. *Geier* (EX1003), ¶ 76.

that the purpose of the multi-link communications are to allow data transmissions between client 605 and server 650:

[S]erver computer 665 . . . will then, through conventional multi-link protocol processing correctly view links 630 as a common bundle, i.e., a pipe, **for packets generated by and destined to this application** and handle packets appearing thereon as multi-link PPP packets.

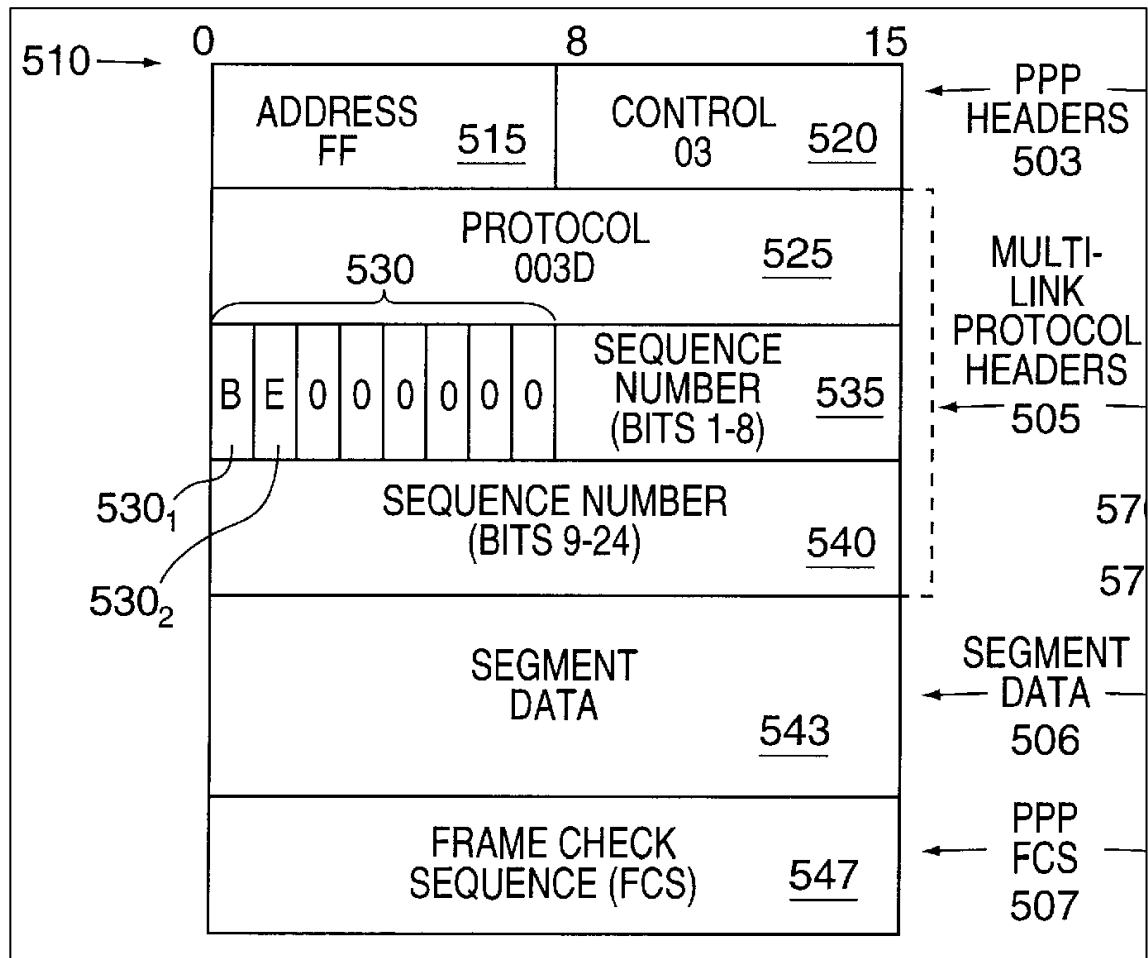
Maurya (EX1004), 14:50-57; *see also* 8:56-10:5.

[A] transmitting side device which transmits (e.g., **any of devices 620 or 660**) an incoming packet . . . can alternate these packets between each of its physical links. . . . **A receiving side device merely passes the multi-link packets it receives to its associated [data terminal equipment] in increasing order of the sequence numbers** of the packets its received, while ignoring beginning and ending flags in the multi-link header . . .

Id. 14:17-15:11 (describing the reception of packets at the client from the server via the terminal adapters 620), Fig. 8 (step 820).

Large transmissions are split into “segments” or “fragments” and sent over multiple network interfaces (i.e., *first and second network interfaces*) to “provide enhanced channel bandwidth.” *Id.*, 6:66-7:6. Payload data is encapsulated as segments in a given PPP packet. *Id.*, 9:56-10:5. The segment data is included in every PPP packet as **field 543** for long-sequence format packets, and it includes the “actual segment data . . . carried by this multi-link PPP packet.” *Id.*, 10:58-59; *see*

also 11:13-18 (segment data field is identical for short-sequence format). Figure 5 illustrates payload-carrying packets:



Id., Fig. 5. In all of Maurya's embodiments, packets have "the general format" of Figure 5, but if packets are to be further split at a receiving site, then the devices situated at the level of the split further encapsulate the incoming packets as segment data and adds a sequence number for a particular "frame segment." *Id.* 15:11-25, Fig. 6C.

[1.3.4] 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.

Limitation 1.3.4 is a statement of general purpose of the data transfer rates recited in limitations 1.1 and 1.2, and, therefore, should not be given patentable weight; regardless, it is taught by, or at least obvious over, Maurya.

A clause that “merely states the result of the limitations” already in the claim “adds nothing to the patentability or substance of the claim.” *Texas Instruments Inc. v. U.S. Int’l Trade Comm’n*, 988 F.2d 1165, 1172 (Fed. Cir. 1993). While result limitations that recite “specific requirements” may be material to patentability, clauses reciting a “general purpose or aspirational result” are not. *See Allergan Sales, LLC v. Sandoz, Inc.*, 935 F.3d 1370, 1379 (Fed. Cir. 2019) (Prost, C.J., concurring); *accord L’Oréal USA, Inc. v. Olaplex, Inc.*, 844 Fed.App’x 308, 324 (Fed. Cir. 2021) (finding claims requiring decreases in hair breakage limiting because they recited specific percent amounts). Here, the limitation recites a “intended result of a process step previously recited,” namely, a non-specific *increased data transfer rate* and thus lacks patentable weight. *Minton v. Nat’l Ass’n of Securities Dealers, Inc.*, 336 F.3d 1373, 1381 (Fed. Cir. 2003) (declining to give “traded efficiently” patentable weight).

Regardless, this limitation is at least obvious over Maurya. Maurya explains that the “multi-link protocol . . . can assign additional bandwidth, on demand, (so-

called ‘BonDing’) in those situations where **two PPP peers can be connected through multiple physical links in a common bundle.**” *Maurya* (EX1004), 3:1-9. By treating multiple physical links as one logical channel, called a pipe, the multilink operation **“dynamically provide[s] sufficient transmission bandwidth for the underlying communication** that is then to be carried by the channel.” *Id.* 3:6-14. This provides **“increases in transmission bandwidth** to a network user.” *Id.*, 2:66-3:1; *see also Geier* (EX1003), ¶¶ 77, 80 (increase in transmission bandwidth permits increased transfer rates).

Further, providing an increased data transfer rate by splitting the data over multiple lower-rate paths was the benefit of using the ML-PPP. *Geier* (EX1003), ¶ 53. The applicant even suggested during prosecution that the use of multiple links to fulfill an increased data transfer rate for a device was inherent in a multilink PPP connection. EX1002, 343. Thus, a POSA would appreciate that by employing multilink communications using multiple links, Maurya’s systems provides for an increased bandwidth.

4. Claim 2

2. The client device of claim 1, wherein the at least one processor further is configured to transmit the first message and the second message to at least one server, wherein the at least one server is a device providing the data packets, or a device that manages the client device and another device that is providing data to the client device.

Claim 2 depends from claim 1, which is obvious over Maurya in view of Low.

Maurya teaches, or at least renders obvious, the additional limitation of claim 2. As an initial matter, limitations 1.3.1 and 1.3.2 already require a processor configured to transmit the first and second messages to a server, so this aspect of claim 2 is rendered obvious by Maurya and Low for the reasons discussed in Sec. IV.A.3.

Claim 2 recites that the server may be *a device providing the data packets or a device that manages the client device and another device providing data to the client device*. As discussed regarding limitation 1.3.3, Maurya discloses that the client receives data packets from the server; thus, the server is a device *providing the data packets*. Maurya (EX1004), 14:50-57; *see also* 2:19-25, 8:56-10:5, 14:17-15:11, Fig. 8.

Thus, claim 2 is obvious over the combination of Maurya and Low.

5. Claim 5

5. The client device of claim 1, wherein each of the first network interface and the second network interface is one or more of cellular interface, Wi-Fi interface, a wireless interface, a cable interface, a wired interface, an Ethernet interface, a Bluetooth interface, a near-field communication interface, and an optical interface.

Claim 5 depends from claim 1, which is obvious over Maurya in view of Low. The added limitation of claim 5 is at least obvious over Maurya.

Claim 5 requires that the first network and second network interfaces are “one or more” of, *inter alia*, a wireless interface and a wired interface, along with other examples. Maurya’s system uses ISDN terminal adapters connected to the client

PC's communication interfaces 612 via links 615, which Maurya also refers to as "leads," indicating a wired connection. *Maurya* (EX1004), 11:12-16. Additionally, ISDN devices ultimately utilized a *wired* network system that allowed communications over a telephone network. *Geier* (EX1003), ¶¶ 81–82.

Notably, by including both *wireless* and *wired* interfaces, claim 5 encompasses the entire universe configuring a network interface to communicate; therefore, it is obvious for the same reasons discussed regarding claim 1. *Geier* (EX1003), ¶ 81.

Thus, claim 5 is obvious over the combination of Maurya and Low.

6. Claim 6

6. The client device of claim 1, wherein the processor is configured to reorder the one or more data packets that are received over the at least two or more network interfaces of the client device during the multilink session.

Claim 6 depends from claim 1, which is obvious over Maurya in view of Low. The added limitation of claim 6 is taught, or at least rendered obvious, by Maurya. Specifically, Maurya discloses that a network interface employing the multi-link protocol would reorder packets based on the incremented portion of the sequence number. *Maurya* (EX1004), 10:54-58 ("The multi-link protocol increments the sequence number by one . . . such that these packets can be properly reordered upon reception to reconstitute a correct PPP frame."); *see also* 4:7-12; 14:61-15:11, 17:9-17 (describing ordering in embodiments using multi-multilink).

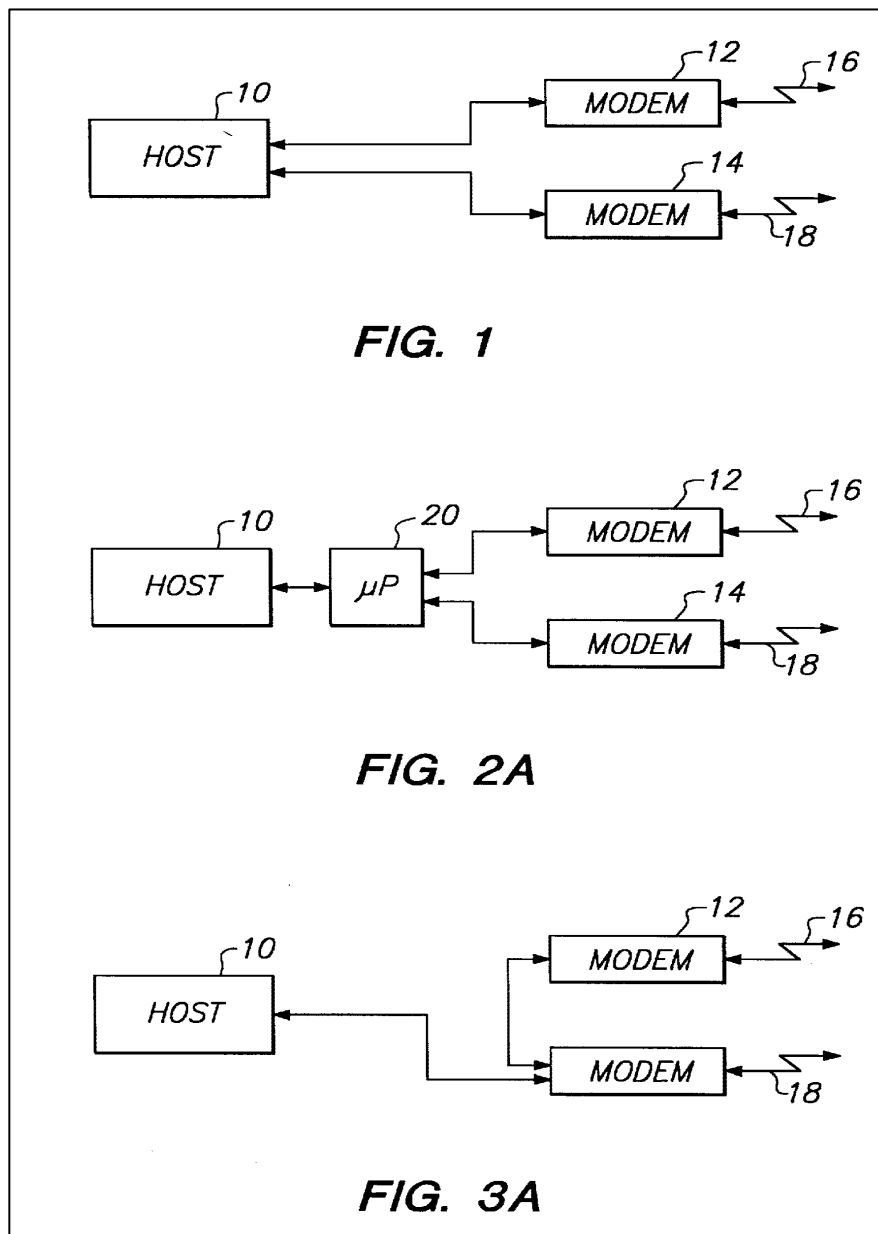
Thus, claim 6 is obvious over the combination of Maurya and Low.

B. Ground 2: Claims 1, 2, 5, 6, and 13–15 are obvious over Maurya in view of Krishnan and Low

1. Overview of Krishnan

Krishnan (EX1006) was filed on August 9, 1996 and issued on September 15, 1998; thus, if the '908 Patent fails to properly claim priority to its parent applications, Krishnan is prior art under post-AIA 35 USC § 102(a)(1)-(2). Additionally, Krishnan is prior art under pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

Krishnan relates to methods for providing high-speed inter-computer data transmissions using multiple low-speed links. *Krishnan* (EX1006), Abstract. Krishnan accomplishes this using link control software to send data over multiple readily available modems:



Id., Figs. 1, 2A, and 3A; *see also*; 1:25-32; 1:42-47 (modems are combined or bonded to create a high-speed data link using two low-speed links); 3:53-65 (in certain embodiments, host may or may not “see” modems as multiple logical connections). The host computer is programmed with multilink point-to-point protocol software (referred to as “MLPPP” in Krishnan), allowing transmitting and

receiving sites to achieve higher bandwidth by splitting a high speed data stream onto multiple low-speed data streams. *Id.*, 2:33-41; *see also*, e.g., claims 1, 10.

Krishnan is analogous art to the '908 Patent. *Geier* (EX1003), ¶ 93. Krishnan is within the field of endeavor of the '908 Patent, as it relates to techniques of communicating large amounts of data between different devices, including in the context of the ML-PPP. *Krishnan* (EX1006), 2:22-41. Additionally, it is reasonably pertinent to at least one problem concerning the inventors of the '908 Patent, as it discloses providing enhanced services using existing public-telephone network connections. *Id.*, 1:36-50; *see also* '908 Patent (EX1001), 2:45-60 (device connected to primary plain-old-telephone-service line).

2. *Claim 1*

[1P]. A client device for multilink data packet communication with a server, the client device comprising:

As discussed in Sec. IV.A.3, Maurya discloses a *client device* (client 605) for *multilink packet communication with a server* (server 650) using multiple ISDN adapters.

Regarding the limitations that follow, Maurya is still cited for its disclosure related to a client device communicating over multiple links with a server via specific multilink configuration packets. Combined with Krishnan, Maurya's client device would communicate using interfaces with multiple modems at an endpoint

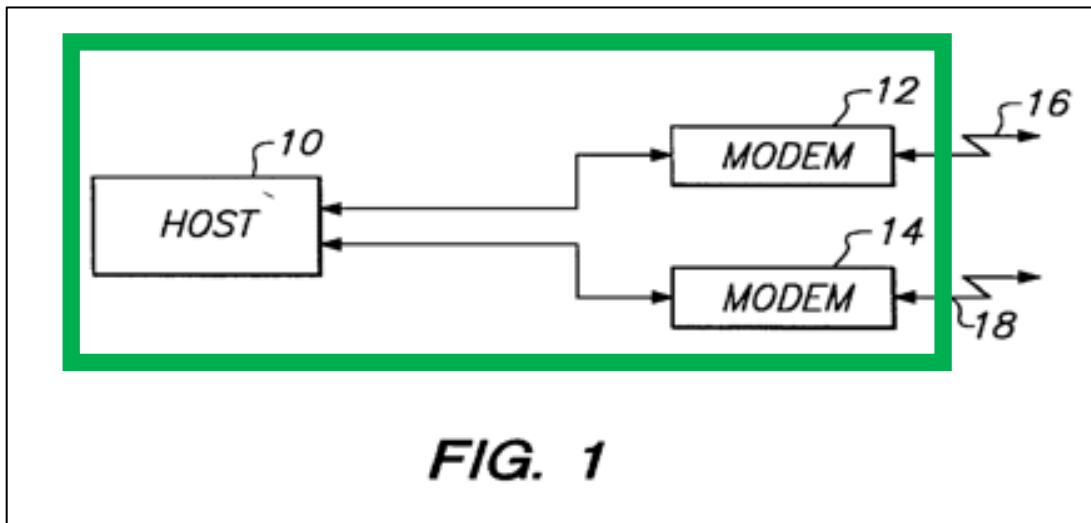
client. *Geier* (EX1003), ¶ 97. Like Maurya, Krishnan discloses communication systems and methods for multilink packet communication. *Krishnan* (EX1006), 2:31-36 (“Host computer 10 is also programmed with link control software implementing a multi-link data communication protocol such as the Multi Link Point-to-Point Protocol”); *see also* 4:5-5:6 (claim 1, reciting communications between host and a remote computer). Krishnan discloses that a transmitting device “split[s] a single high speed data stream into multiple parallel data streams” that can be recovered at the receiving site as a high-speed data stream. *Id.*, 2:23-40.

A POSA would have recognized that Krishnan’s disclosure related to computer 10 were applicable to a client device, like Maurya’s client 605. *Geier* (EX1003), ¶¶ 94–96. Computer 10 is “an IBM compatible PC or other personal computer,” and because the receiving site itself “receives and demultiplexes the multiple low speed data stream to recover the original high speed data stream,” it must be able to employ the multilink protocol. *Krishnan* (EX1006), 1:36–42; *see also Geier* (EX1003), ¶ 96 (both ends of a pipe must employ the multilink protocol; otherwise configuration requests would not be acknowledged). Further, computer 10 is a server is just one embodiment (EX1006, 3:6-10), and as Maurya shows, in ML-PPP communications, both clients and servers were capable of employing multiple links. *Geier* (EX1003), ¶ 96; *see also Maurya* (EX1004), Fig. 6A (client includes multiple communication interfaces and links); Abstract, 6:66-7:6.

Thus, a POSA would have appreciated from Krishnan's disclosure that the arrangement for computer 10 illustrated in Figures 1–3 are applicable to Maurya's client 605. *Geier* (EX1003), ¶ 96. For the purposes of the mapping to the body of claim 1 below, Petitioner has annotated the figures with the understanding that the basic configuration of the host and remote computers are the same in the proposed combination, employing Maurya's teachings of using multiple outgoing links at a client-side device in view of Krishnan's teachings using modems.

Krishnan discloses multiple embodiments of achieving multi-link communications to and from a device, such as (1) a computer connected having multiple interfaces to allow it to communicate over different modems (Fig. 1); and (2) a computer having a single interface to connect it to a communications controller connected to multiple modems (Figs. 2A, 2B); and (3) a computer having a single interface connecting it to a modem that is daisy chained to other modems (Figs. 3A, 3B). *Id.*, Figs. 1, 2A, and 3A; *see also* 3:20-23 (describing communication controller 20); 3:66-4:3 (describing multilink modem 34).¹² For the mapping of claim 1, Petitioner refers to Krishnan's Figure 1 embodiment:

¹² Figure 3A is missing reference number 34. EX1006, 3:66-4:6, Fig. 3B.



Krishnan (EX1006), Fig. 1 (annotated).

A POSA would have been motivated to implement Maurya's client using multiple modems as opposed to ISDN adapters for three reasons. First, *Krishnan* provides express motivation to combine, explaining that modems were cheaper and more widely available than ISDN connections. *Id.*, 1:25-33; *see also Geier* (EX1003), ¶ 98.

Second, a POSA would have recognized that using *Krishnan*'s modems would have been a simple matter of applying a known technique (the use of multiple network devices, such as modems) to a known device (an ML-PPP client device) ready for improvement to yield predictable results. *Geier* (EX1003), ¶ 99. Indeed, although Maurya suggests that conventional modems did not themselves possess multiple incoming and outgoing links (*Maurya* (EX1004), 4:33-41), *Krishnan*, which was published after Maurya was filed, addressed this by arranging the

modems in a setup similar to Maurya's ISDN adapters—by linking and managing multiple modems at a computer programmed with link control software. *Geier* (EX1003), ¶ 99; *see also Krishnan* (EX1006), 2:31-41; 3:59-65.

Finally, the proposed combination would have at most amounted to a simple substitution of one known element (Krishnan's modems) for another (Maurya's ISDN adapters) to obtain predictable results: the communication of multilink packets to and from a server over the PTSN using alternative networking devices. *Geier* (EX1003), ¶ 100.

Further, a POSA would have had a reasonable expectation of success in making the modification because both Krishnan and Maurya are similar systems that use the ML-PPP and have similar goals (transmitting and receiving large amounts of data). *Id.*, ¶ 101. Both Maurya and Krishnan connect these network devices to single system including a personal computer that is programmed to execute the multilink protocol. *Maurya* (EX1004), 3:46-53, 7:6-13, 13:61-14:5; *see also Krishnan* (EX1006), 1:40-42, 2:24-36. Maurya simply discloses techniques for clients to communicate using multiple ISDN adapters via the ML-PPP, while Krishnan teaches using multiple modems. *Geier* (EX1003), ¶ 101; *Maurya* (EX1004), Abstract; *Krishnan* (EX1004), Abstract.

[1.1]. a first network interface having a first data transfer rate associated with a first path from the server to the first network interface of the client device;

This limitation is obvious over Maurya in combination with Krishnan. Both Maurya and Krishnan teach *a first network interface having a first data transfer rate associated with a first path* between two devices, such as a *server to first network interface* of a client. In Maurya, the client device links to ISDN terminal adapters to communicate with the server (see Sec. IV.A.3), while in Krishnan, conventional modems are used. Combined, Maurya and Krishnan teach a *client device* (e.g., a client 605) using the ML-PPP and *having a first network interface* (e.g., a network interface with a modem) *having a first data transfer rate associated with a first path from the server to the second network interface* (e.g., path 16) of the client device. For the same reasons discussed regarding the preamble, a POSA would have been motivated to combine, and would have had a reasonable expectation of success in combining, Maurya and Krishnan to achieve client-server communications using a client device with two modems associated with the same or different rates across separate paths using the ML-PPP. *Geier* (EX1003), ¶¶ 97–101.

Krishnan teaches a device comprising *a first network interface* (e.g., a network port linked to modem 12) has a first data transfer rate (e.g., 28.8 kbps), *associated with a first path from the server to the first network interface of the client device* (e.g., path 16):

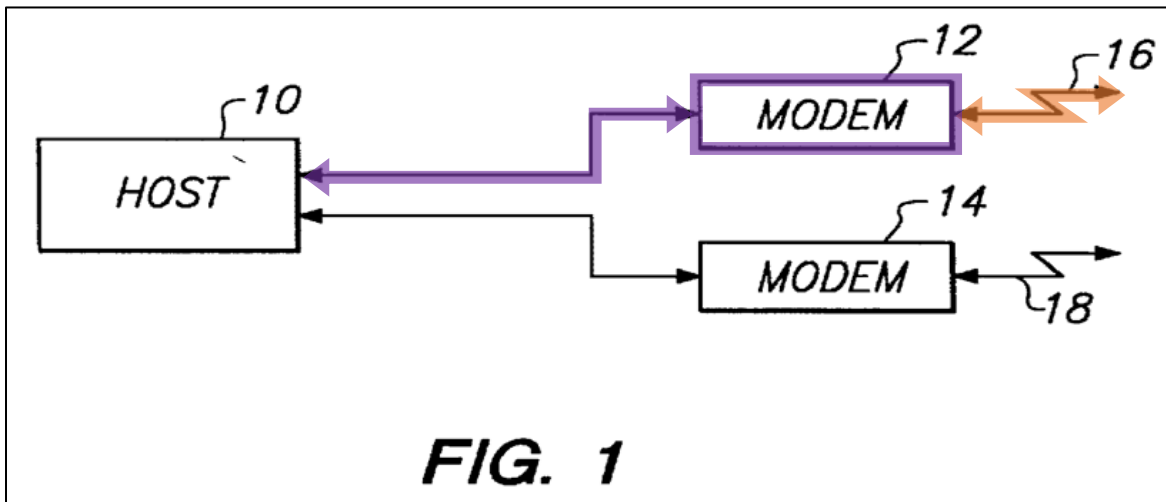
Modems 12 and 14 are coupled to separate data ports of host computer 10 and to separate telephone lines 16 and 18. Although only two modems are shown, additional modems may be used, as long as each one is coupled to a separate data port of host computer 10.

Krishnan (EX1004), 2:22-29; *see also* 3:14-29 (describing embodiment of Figure 2, where a communication controller, “which may be a stand-alone unit or an ‘add-in’ card within host computer 10,” includes “**low-speed ports 30 and 32 for connecting to multiple modems**” executes link control software).

Krishnan also discloses that the first network interface has a first data transfer rate associated with path 16:

[I]f the **data transmission rates across PSTN links 16 and 18** are unequal, the link control software may transmit data proportional to the data rate of modems 12 and 14. Thus, if **modem 12 transmits at 28.8 kbps** and modem 14 transmits at only 14.4 kbps, link control the [*sic*] software may transmit twice as much data via modem 12 as via modem 14.

Id., 2:66-3:5; *see also* 4:50-5:6 (claim 1, reciting “first modem circuitry coupled to the processor and to a first communication link, **the first communication link capable of transmitting data at a maximum rate of N bits/second**”).



Id., Fig. 1 (annotated to show the **first network interface** and the **first path to the server**); see also Figs. 2A, 2B (alternative embodiment where a communication controller is used to enable multiple network interfaces with a host).¹³ While Krishnan discloses different transfer rates in one embodiment, it also teaches the use of the same transfer rates. See, e.g., *id.*, claim 9

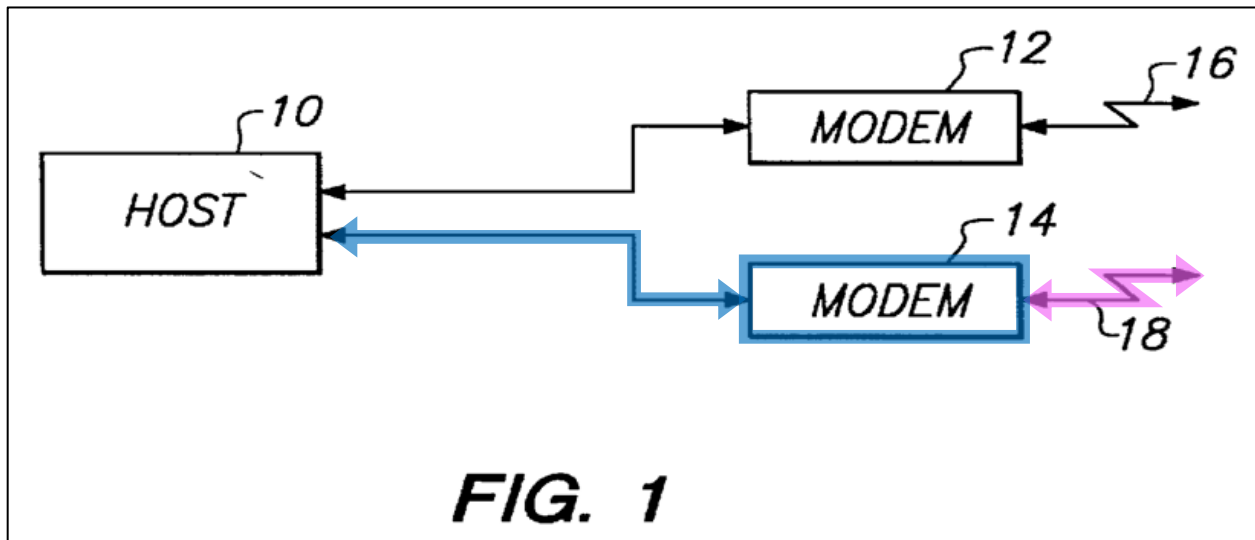
[1.2] a second network interface having a second data transfer rate associated with a second path from the server to the second network interface of the client device; and

This limitation is obvious over Maurya in combination with Krishnan. Both Maurya and Krishnan teach *a second network interface having a first data transfer rate associated with a second path between two devices, such as a server to second*

¹³ As discussed regarding the preamble, while computer 10 acts as a server in some embodiments, a POSA would have recognized that the structure was also applicable to a personal client computer based on Krishnan's disclosure.

network interface of a client. In Maurya, the client 605 comprises ISDN terminal adapters to communicate with the server (*see* Sec. IV.A.3), while Krishnan uses modems. Combined, Maurya and Krishnan teach a *client device* (e.g., a client 605) using the ML-PPP and *having a second network interface* (e.g., a network interface with a modem) *having a second data transfer rate associated with a second path from the server to the second network interface* (e.g., path 18) of the client device. For the same reasons discussed regarding the preamble and limitation 1.1, a POSA would have been motivated to combine, and would have had a reasonable expectation of success in combining, Maurya and Krishnan to achieve client-server communications using a client device with two modems associated with the same or different rates across separate paths using the ML-PPP. *Geier* (EX1003), ¶¶ 97–101.

Krishnan discloses a computer having *a second network interface* (network port linked to modem 14) *that has a second data transfer rate* (e.g., 14.4 kbps), *associated with a second path from the server to the first network interface of the client device* (e.g., bidirectional path 18, between a host computer and remote computer):



Krishnan (EX1006), Fig. 1 (annotated); *see also* 2:63-3:5 (describing the different transfer rates across paths 16 and 18); *see also* 4:50-5:6 (claim 1, reciting “**second modem circuitry second modem circuitry coupled to the processor and to a second communication link**, the second communication link capable of transmitting data **at a maximum rate of M bits/second**”); *see also* Figs. 2A, 2B (alternative embodiment using communication controller 22).¹⁴ While *Krishnan* discloses different transfer rates in one embodiment, it also teaches the use of the same transfer rates. *See, e.g., id.*, claim 9.

[1.3]. at least one processor configured to:

This limitation is obvious over the combination of *Maurya* and *Krishnan*. As

¹⁴ As discussed, while computer 10 acts as a server in some embodiments, a POSA would have recognized that it was also applicable to a personal client computer.

discussed, Maurya teaches or at least renders obvious this limitation. Sec. IV.A.3 (1.3).

Krishnan likewise discloses *at least one processor* that may be incorporated into or connected with a client device. In Krishnan's Figure 1 embodiment, it is a processor on the computer that executes link control software. *See Krishnan* (EX1006), 3:19-22; *see also* 2:31-36 ("**Host computer 10 is also programmed with link control software** implementing a multi-link data communication protocol . . .").¹⁵ In discussing the Figure 2 embodiment, Krishnan confirms that it is a "host processor" that executes the link control software described with respect to Figure 1:

Communication controller 20, which may be a stand-alone unit, or an "add-in" card within host computer 10, **executes link control software similar to the software executed on host processor 10 of FIG. 1**. The controller off-loads link control processing from the host thereby reducing the processing load on the **processor of host computer 10**.

Id., 3:14-25; *see also* 3:29-34 ("**Processor 22** may be any sufficiently powerful general purpose processor," or a "digital signal processor"); claims 1, 5–6 (processor may be on host computer or separate from host computer); 1:51-63.

¹⁵ As discussed regarding the preamble, the remote computer receiving data would also be set up with this arrangement to reconstruct the high-speed data stream.

Further, it would have been obvious to implement the client computer taught by Maurya to employ a processor and associated software allowing ML-PPP transmissions over separate modems, as taught by Krishnan. A POSA would have been motivated to modify Maurya's system and would have had a reasonable expectation of success in doing so for the same reasons discussed regarding the preamble and limitation 1.1. As further motivation, a POSA would have recognized that configuring a central client-based *processor* to perform the functions related to controlling the ML-PPP communication links would have been a simple matter of combining prior art elements (Krishnan's modem-based architecture and Maurya's teachings related to PPP communications) according to known methods (ML-PPP communications) to yield predictable results (the communication of data using the multilink protocol). *Geier* (EX1003), ¶ 99.

[1.3.1]. transmit a first message through the first network interface to the server, wherein the first message includes a multilink request [sic] a destination URL;

This limitation is obvious over the combination of Maurya, Krishnan, and Low. As discussed in Sec IV.A.3, the combination of Maurya and Low discloses transmitting a *message first message through a first network interface to the server, wherein the first message includes a multilink request [sic] a destination URL*. Combined with Krishnan, the network interfaces would connect to readily available modems to achieve multiple links at a device executing the multilink protocol.

As discussed regarding Ground 1, Maurya discloses that links would be configured using LCP configuration packets, including a first configuration request indicating a multilink configuration in a type field (i.e., *a multilink request*) sent over a first terminal adapter of client 605 to a corresponding terminal adapter of server 650. Sec. IV.A.3 (1.3.1). In light of the combination of Maurya and Low, a POSA would have been motivated to include, and would have reasonably expected success in including, a *destination URL* in messages between a client PC and a server resource in order to reach the appropriate destination. *Id.* For the reasons discussed regarding the preamble and limitation 1.1, a POSA would have been motivated to, and would have reasonably expected success in, implementing Maurya's *first network interface* using a first data port to a first modem 12, as taught by Krishnan.

[1.3.2] transmit a second message through the second network interface to the server, wherein the second message includes a multilink session identification [sic] the destination URL; and

This limitation is obvious over the combination of Maurya, Krishnan, and Low. As discussed regarding Ground 1, Maurya discloses that links would be configured using LCP configuration packets, including a second request specifying a unique endpoint discriminator (i.e., *multilink session identification*) sent from a second terminal adapter at client 605 to a corresponding adapter at server 650. Sec. IV.A.3 (1.3.2). In light of the combination of Maurya and Low, a POSA would have been motivated to include, and would have reasonably expected success in

including, a *destination URL* in configuration messages between a client PC and a server. *Id.*

For the reasons discussed regarding the preamble and limitation 1.2, a POSA would have been motivated to, and would have reasonably expected success in, implementing Maurya's *second network interface* using a second data port to a second modem 14, as taught by Krishnan.

[1.3.3] receive data packets from the server through the first and second network interfaces of the client device during the multilink session

As discussed in Ground 1, Maurya teaches, or at least renders obvious, this limitation. *See* Sec. IV.A.3 (1.3.3), *see also, e.g., Maurya* (EX1004), 14:50-57; Fig. 5 (example packet fragment), Fig. 6B (multi-multilink packet).

The combination with Krishnan would not change Maurya's disclosure regarding the transmission and reception of packets. Krishnan similarly discloses that packets are split by a transmitting site and that a receiving site receives and demultiplexes multiple low-speed data streams to recover a high-speed data stream. *Krishnan* (EX1006); Abstract, 2:36-41 (a transmitting site splits data over multiple low-speed data streams to allow a "receiver" to recover a high-speed data stream); *see also* Figs. 1, 2A, 3A. As discussed regarding a preamble, a POSA would have recognized that the architecture illustrated in Figure 1, which includes bi-directional arrows, would apply to a receiving client device. *Geier* (EX1003), ¶¶ 94-96.

For the same reasons discussed regarding the preamble and limitations 1.1 and 1.2, a POSA would have been motivated to implement, and would have had a reasonable expectation of success in implementing, Maurya's teachings using Krishnan's modem-based architecture.

[1.3.4] 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.

As discussed, limitation 1.3.4 is a statement of general purpose of the data transfer rates recited in limitations 1.1 and 1.2, and, therefore, should not be given patentable weight (*see* Sec. IV.A.3).

Regardless, this limitation is obvious over the combination of Maurya and Krishnan. As discussed above, providing an increased data transfer rate by splitting the data over multiple lower-rate paths was a benefit of using the ML-PPP, which Maurya confirms. *See* Sec. IV.A.3.

This would continue to be the case even implementing Maurya's ML-PPP techniques using Krishnan's modems, as Krishnan confirms that by using multiple modems and the ML-PPP, its system would "combine" the connections to "create a high speed data link" by splitting a high-speed data stream among multiple lower speed parallel data streams, each transmitted via a low speed modem and PSTN connection. *Krishnan* (EX1006), 1:36-50; *see also* Abstract, 2:36-41 (similar); claim 11 (a processor transmits data at a data rate of " $N+M$ " by transmitting data over

multiple modems); *Geier* (EX1003), ¶ 101.

Thus, this limitation is obvious over Maurya in view of Krishnan.

3. Claim 13

Claim 13 is like claim 1, but recites a device comprise a network interface that transmits messages to second and third devices, not necessarily a server. Claim 13 is obvious over the combination of Maurya, Krishnan, and Low.

[13P]. A first device comprising:

As with claim 1, the body of claim 13 is structurally complete; therefore, the preamble is non-limiting. Sec. IV.A.3 (1P). Even if the preamble is limiting, Maurya discloses, or at least renders obvious, a *first device*, such as personal computer 610 (i.e., *a first device*). *Id.*; *Maurya* (EX1004), 3:46-53, 7:6-13.

[13.1] a network interface; and

This limitation is obvious over Maurya in view of Krishnan. As discussed regarding claim 1, Maurya combined with Krishnan teaches a computer having at least one *network interface*, such as multiple ports to separate modems (Figure 1 embodiment) one port to a communications controller connected to multiple modems (Figure 2 embodiment) or a port to a multilink modem daisy chained to other modems (Figure 3 embodiment). *See* Sec. IV.B.2. (1P, 1.1, 1.2).

[13.2] at least one processor configured to:

This limitation is obvious over Maurya in view of Krishnan. As discussed

regarding limitation 1.3, Maurya combined with Krishnan teaches that the computer includes a processor configured to handle sending and receiving information via the multilink protocol over multiple modems. *See* Sec. IV.B.2 (1.3).

[13.2.1] transmit a first message through the network interface to a second device, wherein the first message includes a multilink request and a destination URL, the network interface to the second device having a data transfer rate associated therewith:

[13.2.2] transmit a second message through the network interface to a third device, wherein the second message includes a multilink session identification that is unique to the multilink session and the destination URL, the network interface to the third device having a data transfer rate associated therewith; and:

Limitations 13.2.1 and 13.2.2 require the transmission of similar messages from the first device (computer 610) to the second and third devices as the first and second messages recited in limitations 1.3.1 and 1.3.2. To the extent the first device may be associated with multiple network interfaces to the second and third device, these limitations are almost identical to the corresponding limitations of limitations 1.3.1 and 1.3.2, and are obvious over the combination of Maurya, Krishnan, and Low for the same reasons discussed above. *See* Sec. IV.B.2. Specifically, the PC 610 is the first device, while modems 12 and 14 are the second and third devices (or modems 34 and 12, respectively, for the third embodiment of Krishnan). Petitioner addresses potential differences below.

Maurya describes the endpoint discriminator as a *unique* value assigned by the client or server in establishing the link (i.e., *multilink session identification that*

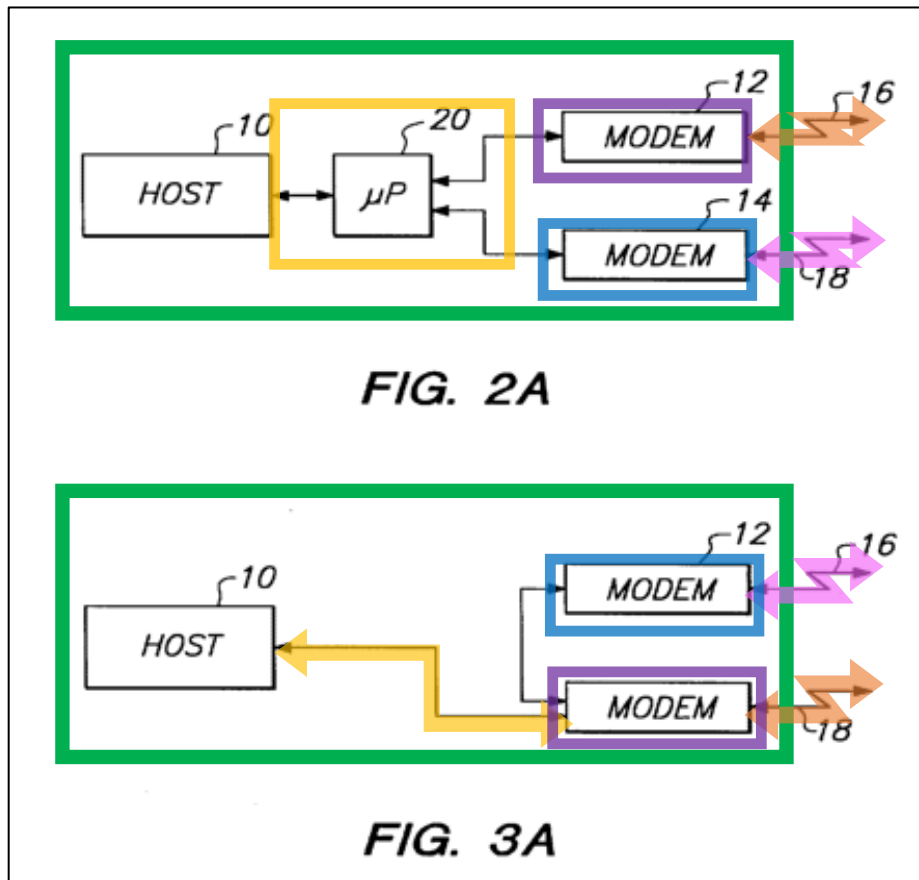
is unique to the multilink session):

During LCP negotiations, a multi-link PPP originator assigns itself a **unique endpoint discriminator value** and informs all its immediate PPP peers by sending the latter, via a first bundle of outgoing links, an LCP Endpoint Discriminator packet containing this value. Each of these immediate PPP peers assumes, as its endpoint discriminator, the value that has been provided to it . . .

Maurya (EX1004), Abstract; *see also* 5:29-42, 13:23-27, 13:61-14:5.¹⁶

To the extent these limitations requires that a **single** network interface to both the second and third devices, such is obvious over *Maurya* in view of the second or third embodiments of *Krishnan*, where a computer includes a single network interface connected to second and third devices via a controller (the Figure 2 embodiments of *Krishnan*) or a multilink modem able to connect with other modems in a daisy-chain fashion (the Figure 3 embodiments of *Krishnan*):

¹⁶ This would have been true even if a magic number was required by the claim, as magic numbers were used until a link was closed typically had a high probability of being unique. *Geier* (EX1003), ¶ 58.



Krishnan (EX1006), Fig. 2A, Fig. 3A (annotated to highlight the first client device in green, the *network interface* in yellow, and *second devices* and *third devices*, purple and blue, respectively, along with their links having an associated data transfer rates, orange and pink, respectively); *see also* 3:14-52 (describing the Figure 2 embodiment, including how the link control software works and how the controller is connected to the host); 3:66-4:17 (describing the Figure 3 embodiment using downstream modems to offload delivery of data); *Geier* (EX1003), ¶¶ 103–104.¹⁷

¹⁷ Claim 13 does not limit the first device to a client computer; it may even be a

Combined with these alternative embodiments, Maurya's client computer would still send the first and second LCP messages discussed regarding limitations 1.3.1 and 1.3.2 to each of the modems, either directly or indirectly, so that they would assume the same unique endpoint discriminator value of the PC client 610 before configuring the link with the server. *Geier* (EX1003), ¶ 103; *see also* Sec. IV.A.3 For example, even though there is one physical connection in these embodiments, the host computer may have device driver software to "see" each modem and manage them through multiple logical connections to the controller/multilink modem. *Krishnan* (EX1006), 3:56-65 (Figure 2).

For the same reasons discussed regarding claim 1, a POSA would have been motivated to combine, and would have had a reasonable expectation of success in combining, Krishnan's teachings regarding the use of modems to communicate data in Maurya's system and would have had a reasonable expectation of success in doing so. Sec. IV.B.2. The Figure 2 and 3 embodiments are alternative examples of arranging Krishnan's system. *Krishnan* (EX1006), 2:8-16. A POSA would have recognized the same motivations and expectations of success in combining Maurya's

server. *See* claim 15. Regardless, as discussed regarding the preamble of claim 1, although Krishnan describes host computer sending data to a remote computer, the configuration applies to a receiving client. *See* Sec. IV.B.2.

teachings regarding a client device using the ML-PPP with multiple outgoing links with Krishnan's alternative arrangements as with the Figure 1 embodiment, as Maurya's teachings relate to managing an endpoint with multiple outgoing links, and Krishnan simply discloses alternative ways of arranging those links. *Geier* (EX1003), ¶ 105.

[13.2.3] receive the different data packets through the at least one network interface from the second device and from the third device during the multilink session¹⁸

As discussed regarding limitation 1.3.3 of claim 1, the combination of Maurya and Krishnan discloses *receiving the different data packets* through at least one interface from the second device (e.g., modem 12) and third device (modem 14). Sec. IV.B.2. However, to the extent this limitation requires a single network interface between the first device and the second and third devices, such is obvious over Maurya in view of Krishnan's Figure 2 or Figure 3 embodiments. As discussed regarding limitations 1.3.3 and 13.2.2, the computer 10 sends and receives data over the multiple modems through one network interface, such as a port to a controller (Figure 2) or specially-programmed multilink modem (Figure 3).

¹⁸ This is the first time *different data packets* is mentioned in claim 13. Petitioner assumes that the word "the" should have been omitted.

[13.2.4]. wherein the data transfer rate associated with the network interface to the second device and the network interface to the third device provide an increased data transfer rate for the first device.¹⁹

As a preliminary matter, this wherein clause states an intended purpose or result and, therefore, lacks patentable weight. *See* Sec. IV.A.3 (1.3.4).

Although the claim does not indicate what the “increased data rate for the first device” is to be compared against, given the context referring to multilink communications earlier in the claim and the intrinsic record, Petitioner assumes this refers to the combined bandwidth provided by using the second and third devices to receive data. *'908 Patent* (EX1001), 11:50-53; *see also* 12:31-44. As discussed regarding limitation 1.3.4, providing an increased data rate was a well-known feature of multilink communications, and it is taught by the combination of Maurya and

¹⁹ Earlier limitations referred to *a network interface* (13.1) and transmitting messages *through the network interface* to the second (13.2.1) and third (13.2.2) devices, but limitation 1.2.3 referred to the “at least one” network interface, and this limitation implies different network interfaces to the second and third devices. Petitioner has shown how the combination of Maurya with different architectures disclosed by Krishnan render the claim obvious whether one or two network interfaces are required. *Intel Corp.*, 21 F.4th at 813-14.

Krishnan. Sec. IV.A.3, IV.B.2 (1.3.4).

4. Claims 2, 5, and 6

Each of claims 2, 5, and 6 depend from claim 1, which is obvious over the combination of Maurya, Krishnan, and Low. These claims are also obvious over the combination of Maurya, Krishnan, and Low.

Maurya discloses the additional limitation of claim 2. Specifically, combined with Krishnan, data packets would still be provided to Maurya's client 605 by a server, such as server 650, just through modems. Sec. IV.A.4.

Regarding claim 5, the combination of Maurya and Krishnan still uses a *wired* network interface, as a wired interface, such as RS-232, couples the modems to ports of the host computer (EX1006, 1:39-42), and paths 16 and 18 go to PTSN telephone lines (EX1006, 2:25-27). *Geier* (EX1003), ¶ 102.

Finally, regarding claim 6, Maurya discloses that original data packets are re-ordered according to sequence numbers of fragments, and this would not change in the combination. Sec. IV.A.6. Indeed, Krishnan notes that in its own, a high-speed data stream may be received “nearly” in sequence, and some processing is necessary to reassemble the original data stream. *Krishnan* (EX1006), 2:63-66.

5. Claim 14

14. The first device of claim 13, wherein the first device and the second device are separate devices or separate parts of the same device.

As discussed, claim 13 is obvious over the combination of Maurya, Krishnan, and Low or Maurya, Krishnan, and Low. As discussed regarding limitation 13.2, the combination of Maurya and Krishnan teach the additional limitation of claim 14. The client computer 610 (the *first device*) is a separate device from each of the modems, including modem 12/34 (the *second device*). Alternatively, these devices are separate parts of the same overall client system 605. *See* Sec. IV.B.3 (13.2.1).

6. Claim 15

15. The first device of claim 13, wherein the first 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 mobile communication device, a wireless communications device, a near-field communications device, and a Bluetooth device.

As discussed, claim 13 is obvious over the combination of Maurya, Krishnan, and Low. Claim 15 adds that the first device may be a computer, which Maurya discloses. Sec. IV.B.3 (13P). Thus, claim 15 is obvious over the combination of Maurya, Krishnan, and Low.

C. Grounds 3 and 4: Claims 1–3, 5, and 6 are Obvious over Maurya in view of Low and DeLangis-156; Claims 1–3, 5, 6, and 13–15 are Obvious over Maurya in view of Krishnan, Low, and DeLangis-156

1. The '908 Patent lacks priority to DeLangis-156

Under 35 U.S.C. § 120, to claim the benefit of the filing date of an earlier

application, a patent must have, *inter alia* a claim must be disclosed in the “manner provided by section 112(a),” including written description support. To show written description support to an earlier application, one must show that the “disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date” sought. *Ariad Pharm., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010).

The burden is on the proponent to show that claims are entitled to an earlier effective priority date. *See Dynamic Drinkware LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1378, 1379 (Fed. Cir. 2015) (quoting *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (to claim priority to an earlier application, patent owner must “show not only the existence of the earlier application, but why the written description in the earlier application supports the claim.”).

Here, the claims of the '908 Patent lacks support under 35 U.S.C. § 112 ¶ 1 at least to U.S. Application 13/531,294 (the '294 Application, **EX1008**), which issued as U.S. Patent 8,861,349 (the '349 Patent, **EX1009**), and earlier applications, in at least three respects.

First, the '294 Application fails to disclose the claimed *first message* sent by a device in independent claims 1 and 13:

[1.3.1] transmit a first message through the first network interface to

the server, wherein **the first message includes** a multilink request [and]
a destination URL

[13.2.1] transmit a first message through the network interface to a
second device, wherein **the first message includes** a multilink request
and a destination URL

The specification of the '349 Patent does not disclose these limitations, nor do the original claims of the '294 Application. EX1003, 35–36. While the '349 Patent discloses that the RCG “that decides to initiate a multilink PPP session with a remote computer i.e. internet URL, requests a multilink PPP session with that URL resource via Link Control Protocol (LCP) session management,” it does not indicate what is included in a message. '349 Patent (EX1003), 11:47-55. Specifically, the '349 Patent does not disclose a message to a server that includes both a multilink request and a “destination URL.” Indeed, with respect to the Figure 7 embodiment describing the multilink request, “computer” and “URL” are used interchangeably, so where it communicates a request “with that URL resource,” the patent is not describing that an initial LCP request *includes* a destination URL in a message that also includes a multilink request. *Id.*, 11:48-53; *see also* 12:59-66 (describing that when a remote RCG drops below a threshold bandwidth that it will “notify the remote computer (URL) to be removed from the multilink bundle ...”); 12:36-42 (describing the “destination URL” as accepting requests to be added to a session). Even if inclusion of a destination URL in a multilink request message was known or

common, such would not save the '908 Patent's priority claims because entitlement to a filing date "extends only to that which is disclosed," **not** what would be obvious over what is disclosed. *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1571–72 (Fed. Cir. 1997). Including a destination URL in a multilink request may have been known, but not an inherent feature of LCP packets, as there were other known ways to reach a destination URL, such as through a uniform resource name that could be resolved into a URL. *Geier* (EX1003), ¶ 52. Here, the '349 Patent simply refers to configuring multilink bundles "per RFC 1990," which does not discuss the use of destination URLs. '349 Patent (EX1009), 11:2-5; *see also Geier* (EX1003), ¶ 36.

Second, independent claim 1 of the '908 Patent recites the following:

[1.3.2] a client device ... comprising ... at least one processor configured to ... transmit a second message through the second network interface **to the server**, wherein the second message includes a multilink session identification [sic] the destination URL

While the '349 Patent discloses a second message to **other RCGs** that include a session ID and a URL of the server, it does not disclose that the initiating RCG transmits this second message through a second network interface **to the server** as claimed, either directly or indirectly. Rather, the other RCGs receive service requests from the initiating RCG ('349 Patent (EX1009), 11:65-12:5, 12:28-33) and then separately transmit their own packets "to the destination URL with the multilink PPP

session ID and a request to be added to that multilink PPP bundle.” *Id.*, 12:36-39. There is no indication that the service messages are copied or forwarded from the initiating RCG or that the initiating RCG itself sends the second message to the server. Thus, this limitation lacks written description support in the ’294 Application.

Third, and finally although “claims may be no broader than the supporting disclosure,” the claims of the ’908 Patent generally go to scope much broader than the ’294 Application’s “stand-alone, external modem like” RCG connected to the POTS. ’349 Patent (EX1009), 2:29-31; *see also* 2:36-40, 2:45-47 (explaining that the RCG is plugged into a POTS line from a local exchange company, or LEC); 3:16-26 (RCG meant to enhance the “existing telephone line,” by “installing the low cost RCG device in the home telephone wiring”); 4:32-36. This is unchanged in the Figure 7 embodiment. *Id.*, Fig. 7 (RCG device still connected to class 5 office over POTS); *see also* 11:1-5. And while the specification generically indicates that “any wireless interface scheme” may be used to configure multilink communications, it does not provide any additional examples or indicate that the RCG device may be *any* standalone wireless device—the POTS interface is still necessary to transfer data. *Id.*, 11:58-60; *see also* 12:3-7 (remote RCGs selected based on available POTS bandwidth for carrying data). Despite this, the claims purport to cover cellular and Bluetooth devices and interfaces for performing multilink bundling (*see, e.g.*, claims

5, 7, 15), and there is no indication in the specification that the inventor had possession over such a broad genus. *Lockwood v.*, 107 F.3d at 1572 (a disclosure of a home television set connected to a central computer with a video disk player did not support claims reciting “an individual terminal containing a video disk player.”). Therefore, the broad claims of the ’908 Patent lack adequate written description in the ’294 Application.

Indeed, the changes to the titles and abstracts over time in this family demonstrate a broader application of ML-PPP than described. The title of the ’908 Patent was changed from “Residential communications gateway (RCG) for broadband communications over a plurality of standard POTS lines, with dynamic allocation of said bandwidth, that requires no additional equipment or modifications to the associated class 5 offices or the PSTN at large” in DeLangis-156 (EX1007, (12)) to “Devices and methods for multipath communications.” EX1001 (12). Further, despite being part of a series of continuations, the Abstract of the ’908 Patent is unrecognizable from those of parent applications, dropping the phrase “residential communications gateway” in favor of “network-edge router,” such as “a cellular device or tower,” none of which are used in the ’349 Patent. *Compare* EX1007 (57) and EX1009 (57); *with* EX1001, (57). Thus, the earliest possible priority date for the ’908 Patent is October 11, 2014, and previous applications may be used as prior art. *See Hollmer v. Harari*, 681 F.3d 1351, 1355 (Fed. Cir. 2012).

DeLangis-156, which was filed on October 14, 2003 and published as U.S. Application 2005/0078690 on April 14, 2005, and issued on October 20, 2009, is prior art at least under pre-AIA 35 USC §§ 102(a) and (e) and post-AIA 102(a)(1).

2. Claims 1, 13

As discussed in Grounds 1 and 2, claim 1 is obvious over the combination of Maurya and Low, and claims 1 and 13 are obvious over the combination of Maurya, Krishnan, and Low. For example, to the extent the endpoint discriminator as described by Maurya is determined not to be a *multilink session identification*, as in limitations 1.3.2 and 13.2.2 such is obvious over the combination of the prior art cited in Grounds 1 and 2 in further view of DeLangis-156, which describes the use of a multilink session identification, such as a magic number, in multilink initialization packets. *DeLangis-156* (EX1007), 12:52-58.

A POSA would have been motivated to combine Maurya's teachings regarding an endpoint discriminator option with using a magic number (i.e., a multilink session identification), as taught by DeLangis-156. *Geier* (EX1003), ¶ 108. Such a combination would have amounted to at most a simple substitution of one known element (an endpoint discriminator for a client device) for another (a magic number unique to a multilink session) to obtain predictable results, namely, the same result accomplished by Maurya in unifying a set of fragments coming from different outgoing links. *Id.*

Further, a POSA would have had a reasonable expectation of success in making the combination, as magic numbers were already a known class of endpoint discriminator options, and Maurya itself indicates that its system would function “equally well” with any class of endpoint discriminator address. *Maurya* (EX1004), 9:50-55; *Geier* (EX1003), ¶ 110. Thus, the combination would have involved at most minor modifications in software and yielded predictable results consistent with Maurya’s disclosure. *Geier* (EX1003), ¶ 110.

3. Claim 3

3. The client device of claim 1, wherein a server provides the multilink session identification that is unique to the multilink session.

Claim 3 depends from claim 1, which is obvious over the combination of Maurya, Krishnan, Low, and DeLangis-156. The additional limitation of claim 3 is obvious over the combination of Maurya in view of DeLangis-156. While Maurya suggests that a server may provide its endpoint discriminator to be used, it does not disclose that this information is assigned *by the server* in a session set up by a client device for receiving packets from the server. Such would have been obvious in further view of DeLangis-156, which describes a multilink session ID as a “magic number” that is assigned by the server. EX1007, 12:11-16.

A POSA would have been motivated to employ some form of identification provided by Maurya’s *server* because such would have been the combination of prior

art elements (the different types of identifying information) according to known methods (known LCP configuration techniques) to yield predictable results. *Geier* (EX1003), ¶ 109. Indeed, it was well known that additional identifying information may be appended to a PPP packet to identify a particular link or bundle. *Geier* (EX1003), ¶ 59. And in its inventive embodiment, Maurya suggests that a server may be an originator for multilink communications for assigning the endpoint discriminator value to all of its immediate PPP peers. *See, e.g., Maurya* (EX1004); 13:61-14:5; *see also* 16:25-30, Fig. 7 (step 730) (disclosing steps when a server is the originator). Additionally, such would have been obvious to try, as only a finite number of devices along a given pipe would supply the identification information for a given session, and one of the ends of the link, which would have been involved in negotiating the configuration options for the link, would be a common-sense choice of these finite options. *Geier* (EX1003), ¶ 109. Finally, a POSA would have had a reasonable expectation of success in making the combination, as such would have been a simple matter of making minor modifications in software and yielding predictable results related to execution of the endpoint discriminator option in Maurya's system.

4. Claims 2, 5–6, 14–15

As discussed in Sections IV.A and IV.B, the additional limitations of dependent claims 2, 6, and 15 are taught by, or obvious over, Maurya, and the

additional limitations of claims 5 and 14 are taught by, or obvious over Maurya (Ground 1) and Maurya in combination with Krishnan (Ground 2). Therefore, claims 2, 5, and 6 are obvious over the combination of Maurya, Low, and DeLangis-156, and claims 2, 5, 6, 14, and 15 are obvious over the combination of Maurya, Krishnan, Low, and DeLangis-156.

V. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests *inter partes* review of Claims 1–3, 5, 6, and 13–15 of U.S. Patent No. 10,868,908.

Respectfully,

Dated: July 25, 2023

By: /Michelle Aspen/
Michelle Aspen
Reg. No. 75,665

Ellyar Barazesh
Reg. No. 74,096
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Reg. No. 62,429

***Counsel for Petitioner
Unified Patents, LLC***

MANDATORY NOTICES

A. Real Parties-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that Unified Patents, LLC is the real party-in-interest, and further certifies that no other party exercised control or could exercise control over Unified's participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial. In view of *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242-44 (Fed. Cir. 2018), Petitioner has submitted voluntary discovery in support of its certification. *See Jakel* (EX1019).

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner identifies the following related proceedings involving the '908 Patent:

- *Competitive Access Sys., Inc. v. Oracle Corp.*, No. 2:22-cv-00287 (E.D. Tex. Jul. 27, 2022).

Petitioner has not previously challenged the '908 Patent, and Petitioner is unaware of any other challenges involving the particular grounds and evidence discussed herein. Petitioner's grounds should not be denied under the Board's discretion. *See General Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 9-10 (Sept. 6, 2017).

C. Lead and Back-Up Counsel

Pursuant to 37 C.F.R. § 42.8(b)(3)-(4), Petitioner identifies the following designation and service information for lead and back-up counsel. Michelle Aspen

will serve as lead counsel. Ellyar Barazesh and Roshan Mansinghani will serve as back-up counsel. Petitioner consents to electronic service of documents. Please direct all correspondence regarding this proceeding to lead and back-up counsel at their respective email addresses listed below. 37 C.F.R. § 42.8(b)(4).

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Dated: July 25, 2023

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CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24 that the foregoing Petition for *Inter Partes* Review, excluding any table of contents, mandatory notices under 37 C.F.R. §42.8, certificates of service or word count, or appendix of exhibits, contains 13,964 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: July 25, 2023

By: /Michelle Aspen/
Michelle Aspen
Reg. No. 75,665

Counsel for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105, the undersigned certifies that on July 25, 2023, a complete and entire copy of this Petition for *Inter Partes* Review, including all exhibits listed in the Appendix of Exhibits, as well as the accompanying Power of Attorney, was provided via USPS Priority Express to the Patent Owner by serving the counsel of record for the '908 Patent as listed on Patent Center:

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UNITED STATES

Dated: July 25, 2023

By: XX
Ashley Cheung

Paralegal for Petitioner