

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FREEWHEEL MEDIA, INC.,
Petitioner,

v.

ALMONDNET, INC.,
Patent Owner.

Case IPR2024-00419
Patent 11,564,015

**SECOND DECLARATION OF DAVID B. LETT IN SUPPORT
OF PETITIONER FREEWHEEL MEDIA, INC.'S REPLY TO
PATENT OWNER'S RESPONSE**

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I, David B. Lett, declare as follows.

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of the Petitioner, FreeWheel Media, Inc., for the above-referenced *inter partes* review proceeding.

2. I have been asked to provide an additional declaration responding to arguments raised by the Patent Owner in its Response dated December 11, 2024, and in the Declaration of Mr. Erik de la Iglesia dated December 11, 2024.

3. I am being compensated at my usual consulting rate for my work on this matter. This compensation is in no way dependent upon my opinions, my testimony, or the outcome of this proceeding.

II. MATERIALS REVIEWED

4. In connection with my study of this matter and reaching the opinions stated herein, I have reviewed a number of documents including the exhibits listed in Appendix A.

III. UNDERSTANDING OF APPLICABLE LEGAL STANDARDS

5. Although I am not an attorney, I have a general understanding of the applicable legal standards pertaining to the patentability issues presented in this proceeding. That understanding was set forth in Section IV of my first Declaration. Ex. 1002, ¶¶18-28.

IV. THE LEVEL OF ORDINARY SKILL IN THE RELEVANT ART

6. I have reviewed Mr. Erik de la Iglesia's Declaration (Ex. 2001) and the transcript of his deposition (Ex. 1099). In its Institution Decision ("Decision" or "ID"), the Board adopted Petitioner's proposed level of ordinary skill, stating that "it is consistent with the level of skill reflected by the '015 patent specification and the asserted prior art." ID 10. Patent Owner's expert, Mr. de la Iglesia, adopted Petitioner's proposed level of ordinary skill that was included in my previous declaration. Ex. 2001, ¶28. Patent Owner's expert also noted that the person of ordinary skill "would have understood the details of port number recycling as part of network address translation." *Id.* While I agree with Mr. de la Iglesia that a POSA would have understood details about port number recycling in the context of network address translations, I disagree with his conclusion that a POSA would have been aware that port numbers were "unsuitable for use as device identifiers" in the combinations presented in Ground D and Ground E. *Id.* In addition to being aware of the concept of port number recycling, a POSA also would have understood the details of the Transmission Control Protocol (TCP), including the difference between non-persistent TCP connections ("non-persistent connections") and persistent TCP connections ("persistent connections"), and would have been aware of how each type of TCP connection would have operated in the combinations presented in Ground D and Ground E. I also disagree with Mr. de la Iglesia's

suggestion, raised during his deposition, that a POSA who had two years' experience designing and/or implementing network-based content delivery systems and had knowledge of HTTP would not be aware of the various response status codes in HTTP. Ex. 1099, 18:2-19:11. A POSA would have knowledge of these status codes at least because they are part of and contained within the HTTP standard. *See, e.g.*, Ex. 1073, 32-37; Ex. 1074, 53-65.

7. The multiple references relied upon by Petitioner together provide an understanding of a POSA's knowledge at the relevant time frame and the motivations to combine those references as proposed by Petitioner. Likewise, the multiple references relied upon by Patent Owner provide further understanding of the POSA's knowledge at the relevant time frame.

8. Patent Owner and Mr. de la Iglesia appear to ignore the prior art teachings of multiple references cited in the Response and Mr. de la Iglesia's declaration to demonstrate a POSA's knowledge. By ignoring the teachings of these multiple references, Mr. de la Iglesia (regardless of the level of experience he claims a POSA would have had) and Patent Owner have underestimated the creativity and abilities of a POSA at the time of the alleged invention of the '015 Patent. For example, Ex. 2003 cited by Patent Owner and Mr. de la Iglesia explains that non-persistent TCP connections, which was the default for HTTP/1.0 and required the closing of the connection after one request/response pair, had several disadvantages.

Ex. 2003, 3, 4-5; Ex. 2005, 47. This led to the implementation of HTTP/1.1 where persistent TCP connections became the default mode for communicating web information. Ex. 2003, 3; Ex. 2004, 4; Ex. 2005, 44, 47; Ex. 1074, 44, 160-162; Ex. 1075, 4-5; Ex. 1088, 6-7, 10. With persistent connections, a server leaves the TCP connection open after sending a response such that “[s]ubsequent requests and response between the same client and server can be sent over the same connection.” Ex. 2003, 5; Ex. 1074, 43-44; Ex. 1075, 10-11; Ex. 1088, 8-10. Mr. de la Iglesia acknowledges that a TCP connection is assigned a port number and that the assigned port number is used for the duration of the connection. Ex. 2001, ¶32. Also, Mr. de la Iglesia does not dispute that persistent connections have been the default mode for HTTP/1.1 since 1998. Ex. 2003, 3; Ex. 2004, 4; Ex. 2005, 44, 47; Ex. 1074, 44, 160-162; Ex. 1075, 4-5; Ex. 1088, 6-7; Ex. 1099, 22:14-23:6, 37:15-21. In any event, as explained herein and in my first declaration, a POSA with the stated experience in designing/implementing network-based content delivery systems and knowledge of HTTP would have been familiar with, and would have been able to implement persistent connections within a communications network, like that of Baig’s. Further, contrary to Patent Owner’s and Mr. de la Iglesia’s contentions, a POSA would have been motivated and able to reliably use a combined IP address and port number as a device identifier in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems.

V. A POSA WOULD HAVE FOUND IT OBVIOUS TO USE A COMBINED IP ADDRESS AND PORT NUMBER AS THE DEVICE IDENTIFIER IN THE BAIG-ZWICKY-DAMICK AND BAIG-SATAPATI-DAMICK SYSTEMS

9. For reasons that I discuss in detail below, it is my opinion that, at least by April 17, 2007 (the earliest priority date of the '015 Patent), a POSA would have found it obvious to use the combination of an IP address and port number as a device identifier in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems and, further that the claims of the '015 Patent would have been obvious to a POSA. As I discuss below, I disagree with Patent Owner's and Mr. de la Iglesia's conclusion that a combined IP address and port number "cannot qualify as a device identifier of the sort identified in the '015 patent," that a POSA "would not and could not have used IP address/port number combinations as device identifiers" and that a POSA "would have had been *disincentivized* from attempting to do so." Ex. 2001, ¶31 (emphasis in original); POR 10.

10. As I show below, Patent Owner's and Mr. de la Iglesia's conclusions rely on the faulty premise that a port number would be assigned to a client device for only a few seconds and quickly recycled after being assigned. *See* Ex. 2001, ¶¶28, 32, 34, 35, 37, 38; POR 10, 13-16. Specifically, Mr. de la Iglesia's opinions and conclusions (and Patent Owner's arguments) are based on the assumption that the TCP connections between Baig's web server and the user devices necessarily would have been closed after each request-response transaction. Ex. 2001, ¶33; POR

10, 12. In other words, Mr. de la Iglesia's opinions and conclusions (and Patent Owner's arguments) are based on using what are referred to as non-persistent connections to transport the web traffic between Baig's VCSP website and the web browsers of the users logged into Baig's VCSP community. The evidence shows, however, that persistent connections, which were kept open for additional request-response transactions, were not only known at the time of invention in 2007 but the default type of connection used at that time. Ex. 2003, 3; Ex. 2004, 4; Ex. 2005, 44, 47; Ex. 1074, 44, 160-162; Ex. 1075, 4-5; Ex. 1088, 6-7; Ex. 1094, 18. A POSA thus would have been aware that, at the time of invention in 2007, persistent connections would have been the default type of connection used in Baig's system whereby the connection and the port assigned to it would have persisted until either Baig's server or Baig's user device decided to close it. Ex. 2003, 6; Ex. 2004, 4; Ex. 1074, 44; Ex. 1075, 11.

11. The evidence also contradicts Patent Owner's and Mr. de la Iglesia's unsupported assertions regarding the operation Baig's wireless access point (AP). For example, I disagree with Mr. de la Iglesia's and Patent Owner's assertion that a wireless AP implementing network address translation (NAT) would have used an assigned port number "only for data transferred during [a] specific transaction" and that a port number assigned by the wireless AP "must be quickly recycled to support other users after use." Ex. 2001, ¶32; POR 10. At the time of invention in 2007,

wireless APs were designed to maintain connections between connected client devices (e.g., Baig’s user devices) and a host (e.g., Baig’s VCSP web server). *See*, e.g. Ex. 1085, 1 (user manual for a wireless hotspot gateway), 198 (wireless AP’s idle period for active connections).¹ Consider, for example, the following session table maintained by a wireless hotspot gateway that provides wireless Internet access using the IEEE 802.11g wireless networking standard. *Id.* at 29.

¹ I note that the user manual for this wireless AP was found and relied on by Mr. de la Iglesia in another IPR proceeding where he acknowledged that the wireless AP was available as of July 2006, which is prior to the date of invention of the ’015 Patent in April 2007. Ex. 1084, ¶¶61 (stating that “I was able to locate the below application diagram for a Zyxel Zyair G-4100 v2 Wireless Hotspot Gateway”), 62 fn.2 (indicating that Mr. de la Iglesia located the associated user manual for the wireless AP).

Figure 95 SYSTEM STATUS > Session List

SESSION LIST

1 Page First Previous Next End

No.	TCP/UDP	Client IP	Client Port	Port Fake	Remote IP	Remote Port	Idle
1	UDP	192.168.1.2	1828	50045	172.22.0.3	427	25
2	TCP	192.168.1.2	1970	50010	172.23.5.19	445	51
3	UDP	192.168.1.2	1994	50014	168.95.1.1	53	25
4	UDP	192.168.1.2	1997	50017	168.95.1.1	53	25
5	UDP	192.168.1.2	1998	50018	168.95.1.1	53	25
6	UDP	192.168.1.2	2002	50022	168.95.1.1	53	25
7	UDP	192.168.1.2	2003	50023	168.95.1.1	53	25
8	UDP	192.168.1.2	2005	50025	168.95.1.1	53	25
9	TCP	192.168.1.2	2006	50026	64.86.142.112	80	25
10	TCP	192.168.1.2	2007	50027	64.86.142.112	80	25
11	TCP	192.168.1.2	2009	50029	64.154.81.197	80	25
12	UDP	192.168.1.2	2012	50032	168.95.1.1	53	25
13	UDP	192.168.1.2	2015	50035	168.95.1.1	53	25
14	TCP	192.168.1.2	2016	50036	64.233.167.147	80	25
15	UDP	192.168.1.2	2017	50037	168.95.1.1	53	25
16	TCP	192.168.1.2	2018	50038	209.133.56.106	80	25
17	UDP	192.168.1.2	2019	50039	168.95.1.1	53	25

1 Page First Previous Next End

Ex. 1085, 198 (Fig. 95).

As seen in the session table above, the wireless AP maintains a session table listing the TCP and UDP connections between a client device (assigned private “Client IP” address 192.168.1.2) and various hosts (assigned respective “Remote IP” addresses). Ex. 1085, 198 (Fig. 95). The user manual for this example wireless AP provides the following table describing the fields in its session list, including the “Idle” field, which indicates “how many seconds are left before the session times out **if** there is no more traffic.” *Id.* (Table 53) (emphasis added). As seen in the table below, the idle period for TCP connections in particular at this example wireless AP was set to five minutes (annotated in red). In other words, any TCP connections

established at this example wireless AP would persist so long as there is active traffic across the TCP connections at least every five minutes, which would have reset the idle time out timer.

The following table describes the fields in this screen.

Table 53 SYSTEM STATUS > Session List

LABEL	DESCRIPTION
Page	Select a page number from the drop-down list box to display the selected page.
First	Click First to go to the first page.
Previous	Click Previous to return to the previous page.
Next	Click Next to go to the next page.
End	Click End to go to the last page.
No.	This field displays the index number of an entry.
TCP/UDP	This field displays the type of traffic (TCP or UDP).
Client IP	This field displays the IP address of the client computer.
Client Port	This field displays the port number through which the client computer transmits the traffic.
Port Fake	This field displays the NAT port to and from which the ZyXEL Device maps the session's traffic.
Remote IP	This field displays the IP address of a remote device the client computer accesses.
Remote Port	This field displays the port number of a remote device the client computer accesses.
Idle	This field displays how many seconds are left before the session times out if there is no more traffic. The ZyXEL Device automatically times out idle TCP sessions after 5 minutes (300 seconds). The ZyXEL Device automatically times out idle UDP sessions after 1 minute (60 seconds).

Ex. 1085, 198 (Table 53) (annotated).

12. The functionality of this example AP that maintains connections so long as there is active traffic contradicts Mr. de la Iglesia's assertion of "constantly changing connection table ports of a Wi-Fi access point." Ex. 2001, ¶36. Mr. de la Iglesia provides no evidence to support the allegedly constantly changing nature of every port assigned by a wireless AP or anything else about how a given wireless AP necessarily "would have operated." *Id.* at ¶36 fn.2.

13. Given this evidence that wireless APs at the time of the '015 Patent's date of invention in April 2007 were known to maintain persistent connections between clients and web servers, I disagree with Mr. de la Iglesia's and Patent Owner's assertion that any ports assigned by the wireless AP "must be quickly recycled." Rather, as long as those connections were used to carry traffic between the client and web server, the ports assigned to the connections at the wireless AP during the network address translation (NAT) and port address translation (PAT) procedures would have persisted until either the client or the web server issued an instruction to close the connection. Ex. 2004, 4 ("The client and server must now explicitly specify if they do not want persistent connections by sending the header 'Connection:close'"); Ex. 1074, 44 ("Persistent connections provide a mechanism by which a client and a server can signal the close of a TCP connection. This signaling takes place using the Connection header field."); Ex. 1075, 11 ("Persistent connections stay open across transactions, until either the client or the server decides to close them."). Accordingly, equipped with the knowledge that it was known in the art (and known to a POSA) that APs at the alleged time of the invention were known to maintain persistent connections between clients and web server, a POSA would have understood that a port number assigned by a wireless AP to a persistent connection would not have changed while that connection was kept open. Ex. 1085, 198.

14. I also disagree with Mr. de la Iglesia's assertion that any ports assigned by the wireless AP would have been "further restricted by the security settings of the NATing system and/or upstream firewalls." Ex. 2001, ¶32. I note, for example, that Mr. de la Iglesia does not support this assertion with any corroborating evidence either about wireless APs generally or any particular wireless APs that existed at the time of the '015 Patent's invention in April 2007. *See id.* With respect to Baig, Mr. de la Iglesia does not demonstrate that, much less explain why, the NAT features at Baig's wireless AP necessarily would have had any security settings a POSA would have needed to account for when combining Baig with Zwicky/Satapati and Damick. *See* Ex. 1007, ¶¶43, 46, 51 (discussing NAT operations at Baig's wireless AP). Similarly, Mr. de la Iglesia does not demonstrate that Baig's system necessarily would have included any "upstream firewalls" that a POSA would have needed to contend with when implementing the Baig-Zwicky-Damick and Baig-Satapati-Damick combinations. Ex. 2001, ¶32; *see generally* Ex. 1007 (no mention of any firewall). Absent any reason to believe that NAT or firewall security settings necessarily would have been present in Baig, there is no reason to conclude, as Mr. de la Iglesia does, that the lifetime of the ports assigned by Baig's wireless AP would have been restricted.

15. There's no dispute that port numbers are assigned to TCP connections. *See* Ex. 2001, ¶32 ("Network address translation ... do not assign each individual

device a port number as described in Satapati; they instead assign each individual *TCP connection* an ephemeral port number as connections are created.” and “In my opinion (and as a POSITA as of April 2007 would have recognized), assigning ports to individual devices (rather than to individual connections ...) is not practical ...”) (emphasis in original). Rather, as I explained in my original declaration, combining assigned port numbers with a common IP address allow devices that use that IP address to be uniquely identified and thus serves the device-identifying purpose of the claimed “device identifier.” *See, e.g.*, Ex. 1002, ¶¶338 (“In this way, the combination of the common IP address of access point 106 and an assigned port number allows individual mobile devices to be identified.”), 340 (“when combined with a port number assigned to a device that is connected to the access point, the combination of the IP address and port number discloses a “device identifier” of an Internet-accessing electronic device”), 344 (“The port number thus allows multiple distinct devices to use a single IP address yet be uniquely identified by port number when communicating over the Internet.”) (citing Ex. 1012 at pages 36-38 and Ex. 1006 at paragraphs 4 and 11), 345-346, 347 (“The combined common IP address of the modified Baig system’s access point to which a device was connected and the port number associated with the device (as was a known part of NAT and taught by Satapati and Zwicky) thus provide a ‘device identifier’ because, together, they uniquely identify a particular mobile device that seeks to connect with the content

server in Baig.”). These opinions were consistent with the teachings of Satapati, which likewise recognized the device-identifying capability of port numbers: “NAT may use port address translation, **where port numbers are used to further identify different devices with the same address.**” Ex. 1006, ¶2 (emphasis added); *see also* Ex. 1002, ¶353. As such, my testimony opined on the ability for port numbers to identify devices when combined with an IP address. Ex. 1002, ¶¶333, 338, 340, 344-347.

16. Mr. de la Iglesia otherwise appears to mischaracterize Satapati by asserting that Satapati teaches assigning port numbers to individual devices. Ex. 2001, ¶32 (“Network address translation ... do [sic] not assign each individual *device* a port number as described in Satapati ...”) (emphasis in original). Mr. de la Iglesia does not attempt to square this view of Satapati with other teachings that make clear Satapati’s NAT functionality is applied to connections rather than devices. *See* Ex. 1006, ¶¶34 (“An example of a **NAT table that lists all network address translations (NAT entries) for current connections** from private IPv4 devices to public IPv4 devices is shown in Table 3.”), 35 (“Table 3 shows **an existing connection** for the first device 308, **which is assigned** the single public IPv4 address 128.1.1.1, with a **port designation** of 10,000.”), 48 (“A search of the NAT NAT-PT database is made to see if **any existing connections** in the NAT NAT-PT database (if any NAT entries or any NAT-PT entries) **use port 10,000** of

the router 306 for a TCP connection for address 128.1.1.1.’), Tables 4-6 (identifying TCP as the protocol for the connection and the port number assigned to the TCP connection) (emphasis added). However, notwithstanding this mischaracterization, Mr. de la Iglesia does not directly address or even acknowledge Satapati’s teaching that, within the context of NAT, “port numbers are used to further identify different devices with the same [IP] address.” Ex. 1006, ¶2. As I explained in my original declaration, “the port number, as described in Zwicky and Satapati, thus allows multiple distinct devices to use a single IP address yet be uniquely identified by port number when communicating over the Internet.” Ex. 1002, ¶346; *see also* ¶¶342 (“packets sent over the Internet include not only the **IP addresses** of the source and destination devices, but also source and destination **port numbers**, which are used to identify an endpoint associated with the source and destination IP addresses”), 343-346 (emphasis in original).

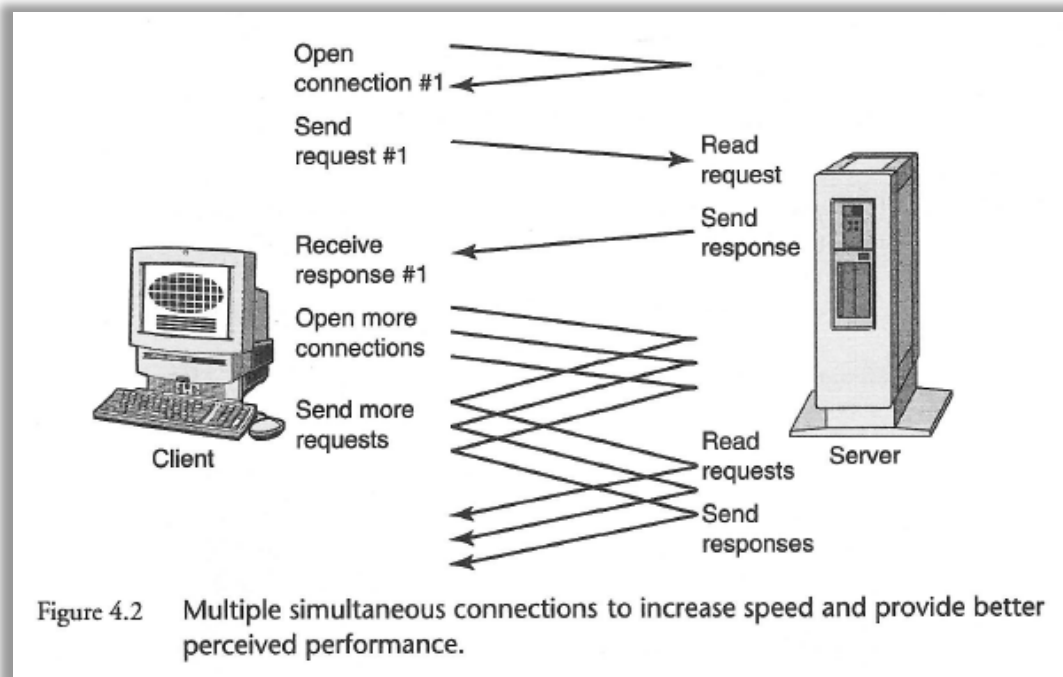
17. I further disagree with Patent Owner and Mr. de la Iglesia that a wireless AP “does not know how many devices will be accessing the Internet through a given access point” and, as a result, “cannot allocate ahead of time the number of ports needed for all parallel tcp [sic] connections that might be initiated from individual devices.” Ex. 2001, ¶32; POR 11. My disagreement with Patent Owner’s argument and Mr. de la Iglesia’s opinion in this regard is twofold.

18. First, a POSA would have recognized that wireless APs that existed at the time of the '015 Patent's date of invention in 2007 were aware of a maximum number of wireless clients that could simultaneously connect to the wireless AP. *See, e.g.,* Ex. 1086, 96 (indicating that the maximum computers per wireless network was typically "30-70 nodes" depending on the amount of wireless traffic from each node). So contrary to Mr. de la Iglesia's and Patent Owner's assertion, a POSA would have recognized that a wireless AP would have been able to anticipate the maximum number of wireless devices that simultaneously access the Internet through the wireless AP.

19. Second, I disagree with Mr. de la Iglesia's and Patent Owner's assertion that each web browser at Baig's user devices necessarily "would have opened a plurality of parallel HTTP connections to obtain content from the servers hosting Baig's website" and that those web browsers necessarily "would have initiated on the order of 10 different HTTP connections to obtain information from a domain hosting the Baig website." Ex. 2001, ¶33 (citing Ex. 2003 and Ex. 2004); POR 11-12. The evidence Mr. de la Iglesia and Patent Owner rely on to support these assertions does not purport to describe the behavior of all web browsers that existed at the time of the '015 Patent's date of invention in April of 2007. For example, Mr. de la Iglesia and Patent Owner rely on the following quotes to support their assertions that Baig's web browsers "**would have** opened a plurality of parallel

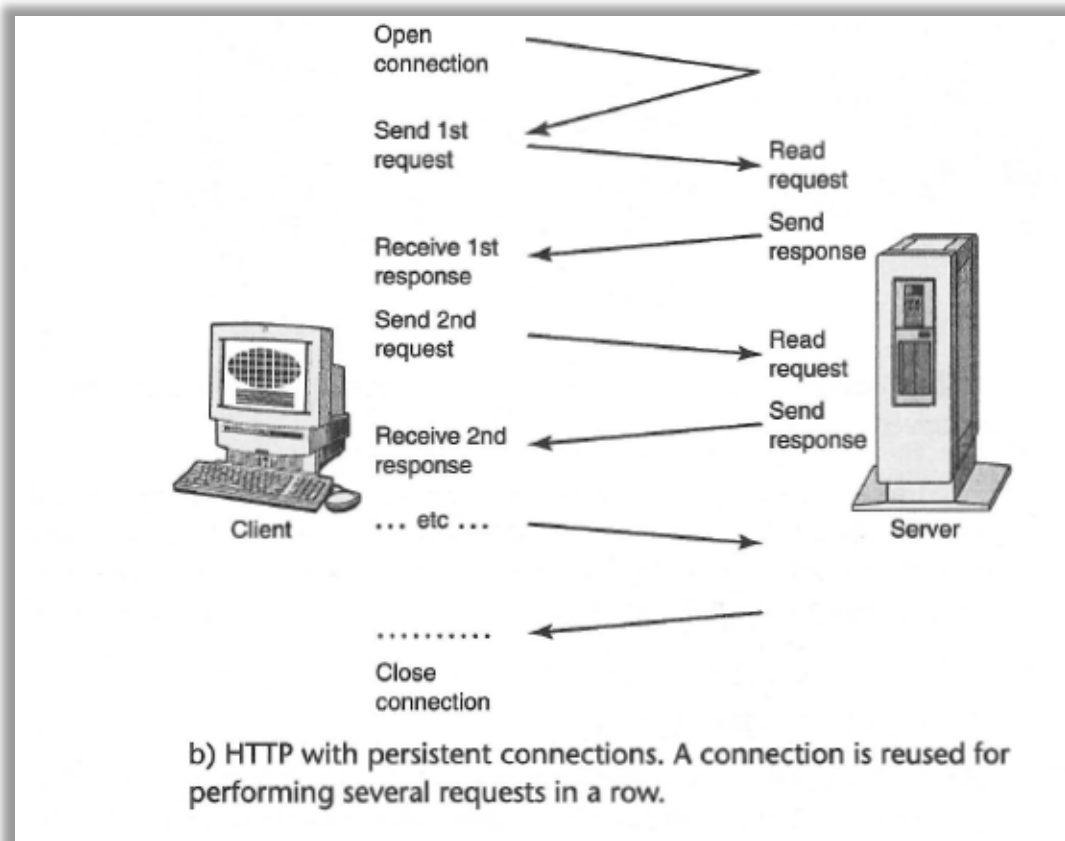
HTTP connections” to Baig’s web server: “In their **default modes, most browsers** open five to ten parallel TCP connections ...” and “**Many Web clients, such as** Netscape Navigator, open up several connections simultaneously...” Ex. 2001, ¶33 (citing Ex. 2003 at page 4 and Ex. 2004 at page 50) (emphasis added); POR 11-12. But these teachings do not characterize the behavior of all web browsers. The reference to web browsers’ “default modes” indicates that non-default modes are possible where web browsers open a single connection rather than multiple, parallel connections. Ex. 2003, 4. Similarly, the reference to “most browsers” and “[m]any Web clients” indicates that other browsers and web clients did not open multiple, parallel connections. I note that Patent Owner’s own evidence shows this to be true. For example, Patent Owner’s evidence teaches that “users can configure modern browsers to control the degree of parallelism” and that the “maximum number of parallel connections can be set to one.” Ex. 2005, 45-46; Ex. 2003, 4.

20. To support their conclusions that web browsers would have opened multiple, parallel connections, Mr. de la Iglesia and Patent Owner point to Figure 4.2 of the Luotonen reference (reproduced below) (Ex. 2001, ¶33; POR 12), which illustrates multiple simultaneous connections between a client and server:



Excerpt from Ex. 2004, 6 (Figure 4.2)

21. Mr. de la Iglesia and Patent Owner, however, do not even mention or acknowledge Figure 4.1(b) on the preceding page of Ex. 2004 (also reproduced below), which illustrates a single, persistent connection between a client and a server that is reused for multiple request-response transactions:



Excerpt from Ex. 2004, 5 (Figure 4.1(b)).

22. Mr. de la Iglesia and Patent Owner do not engage with Figure 4.1(b)'s illustration of a single, persistent connection between a client and a server and make no attempt to reconcile these teachings with their assertion that the web browsers at Baig's user devices necessarily "would have opened a plurality of parallel HTTP connections" to Baig's web server. Ex. 2001, ¶33; POR 11-12. Furthermore, this figure undermines Mr. de la Iglesia's and Patent Owner's insinuation that there was only one type of connection (non-persistent connections) available to use in Baig's system for web communications. I also note that Mr. de la Iglesia and Patent Owner seem to contradict their erroneous assertion about how Baig's web browser

necessarily would have operated by opining that “opening of plural connections, **typically** simultaneously, i.e., in parallel was prevalent in the period” before the ’015 Patent’s date of invention in April 2007. Ex. 2001, ¶33. (emphasis added); POR 12. Here, Mr. de la Iglesia and Patent Owner tacitly recognize that opening multiple, parallel connections was not the behavior of all web browsers, only the purportedly typical behavior of some web browsers. A POSA would have been aware of web browsers existing prior to the ’015 Patent’s date of invention in April 2007 that defaulted to opening a single, persistent connection with a web server. Ex. 1098, 5 (“The Firefox browser for example allows changing the values for pipelining of web requests.” and “Pipelining is activated in the Firefox browser as follows: ...”).

23. Further, as I noted above, a POSA would have understood and it would have been well within their skill, prior to 2007, to configure a browser to set the maximum number of parallel connections to one. Ex. 2005, 45-46; Ex. 2003, 4. In addition, a POSA would have known that a user would have been able to force a web browser to use a single TCP connection by invoking the secure version of HTTP (referred to as HTTPS) by using “https” in the Uniform Resource Locator (URL) for the requested website rather than “http.” Ex. 1087, 5-6 (discussing secure versions of HTTP including HTTPS) and 6 (“HTTPS uses a single TCP connection at port 443.”). Mr. de la Iglesia and Patent Owner, therefore, are incorrect that any and all

web browsers in Baig necessarily would have opened multiple TCP connections to Baig's web server.

24. Mr. de la Iglesia and Patent Owner do not otherwise explain or demonstrate that any particular web browser (such as Netscape Navigator or any other browser that defaulted to opening multiple, parallel connections) necessarily would have been used as the web browser in Baig's system. *See* Ex. 2001, ¶33; POR 11-12. Mr. de la Iglesia and Patent Owner also do not provide any evidentiary support for their assertion that "the number or parallel connections tended to be bursty and often exceeded 5-10 as users opened new browsing tabs while maintaining old tabs." *See id.* Nor does Mr. de la Iglesia explain what he means by "bursty." Ex. 2001, ¶33.

25. Furthermore, Mr. de la Iglesia identifies nothing that supports his assertion that "it was often the Wi-Fi access point that initiated the teardown of connections (often using forced reset flags) to recover resources rather than waiting for user's browsers to time out their own connections." *Id.* Even if true, Mr. de la Iglesia's assertion does not support his argument that an AP would have initiated teardown of those connections immediately after completing a single request-response transaction. Mr. de la Iglesia again tacitly recognizes that not every AP would have functioned as he describes by stating that APs "**often**," not necessarily, initiated teardown of connections thus suggesting that other device-initiated

teardown of connections in other circumstances. *Id.* (emphasis added). Contrary to Mr. de la Iglesia's assertions, APs existed at the time of the '015 Patent's date of invention in April 2007 that kept connections open so long as there was active traffic on the connection and initiated a close of the connection after expiration of an idle period (e.g., five minutes) due to inactivity. *See* Ex. 1085, 198 (description of "Idle" field in Table 53).

26. Mr. de la Iglesia's and Patent Owner's assertion that an AP would be unable to "allocate [port numbers to devices] ahead of time [in a way that could accommodate] the number of ports needed for all parallel tcp [sic] connections" overlooks the expansive range of port numbers available to assign to TCP connections. Ex. 2001, ¶32; POR 11. Patent Owner's own exhibits show that over 16,000 private/dynamic port numbers would have been available to the AP for port address translation when assigning ports to the connections between Baig's user devices and its web server. Ex. 2006, 1 (explaining that private/dynamic port numbers 49,152 to 65,535 "can be used for any purpose" and that registered/user port numbers 1,024 to 49,151 "are generally accessible by any user on a system"); *see also* Ex. 1006, ¶4 (explaining that a "port number is 16 bits, providing 65,536 port numbers" where "port numbers 0-1024 are reserved for defined standard Internet uses" meaning that a NAT device "may use user definable ports 1025-65535 for port address translation"). A POSA would have recognized that the quantity of

port numbers available for port address translation would have allowed an AP, if it desired to do so, to preemptively allocate port numbers based on the quantity of client devices that could be expected to connect to it and the quantity of parallel TCP connections that could be expected from each client device (e.g., a range of port numbers per client device). Using Mr. de la Iglesia's estimates of 5-10 parallel connections (Ex. 2001, ¶33) per client device and an estimated range of 30-70 simultaneously connected client devices² (Ex. 1086, 96), a POSA would have understood that a sufficient quantity of port numbers would have been available to assign to the connections between Baig's AP and the user devices.

27. Furthermore, to the extent Mr. de la Iglesia's assertions about "browsing tabs" are intended to suggest that the users in Baig would have opened new browsing tabs while maintaining old tabs when interacting with Baig's VCSP website, such assertions are unfounded. Any tabs in Baig are part of Baig's VCSP website, not the web browser at the user devices. *See* Ex. 1007, ¶79 ("The **webpage 700 includes a main window 702 having a plurality of tabbed headers 704** that

² I note that Baig's Figure 7 shows twelve users being connected to a common AP with seven of those users logged into the VCSP community for that AP. Ex. 1007, FIGs. 6-7 ("Total 12 users logged on to this node. 7 are logged on to [VCSP website] Munjee.").

are labeled with a description of the available services by the VCSP 202.”) (emphasis added); *see also id.* at ¶¶86, 90-93, and 111 (explaining that each webpage “is substantially the same as shown in FIG. 7, and includes the main screen 702 and the tab headers 704”).

28. Mr. de la Iglesia and Patent Owner cannot dispute that, if Patent Owner’s exhibits (Exs. 2003-2005) demonstrate that opening multiple, parallel connections was prevalent prior to the ’015 Patent’s date of invention in April 2007 as they allege (Ex. 2001, ¶33; POR 11), then those same exhibits must also demonstrate that opening a single, persistent connection also was prevalent during the same time period. Ex. 2005, 45-46 (setting web browser’s maximum parallel connections to one); Ex. 2003, 4.

29. Beyond being merely prevalent, however, a POSA would have known that persistent connections were the default and the preferred type of connection at the time of the ’015 Patent’s date of invention in April 2007. Shortly after the specification for HTTP/1.0 was published in 1996, problems associated with using non-persistent connections (i.e., closing a TCP connection immediately upon completing one request-response transaction) became apparent. Ex. 2003, 4-5; Ex. 2004, 2-4 and 7-10; Ex. 2005, 45-47; Ex. 1074, 43; Ex. 1075, 7-8; Ex. 1076, 2 (left column, third paragraph); Ex. 1077, 3. Such problems included:

- latency resulting from the need to take two round trips between the client and server in order to first complete the “handshake” necessary to establish the connection and then carry out the request-response transaction (Ex. 2003, 4; Ex. 2004, 3; Ex. 2005, 46; Ex. 1077, 3);
- the need to allocate TCP buffers and maintain TCP variables at both the client and web server, which can overburden the web server when serving requests from a relatively high volume of clients (Ex. 2003, 4-5; Ex. 2005, 47);
- unnecessary network congestion on the network due to sending additional packets without application data in order to setup and tear down each short-lived connection (Ex. 1077, 3)
- failure to reach full throughput potential of the short-lived connection due to TCP’s slow start mechanism, which gradually increases the throughput rate so as to avoid unnecessary network congestion (Ex. 2003, 5; Ex. 2004, 4; Ex. 1075, 7; Ex. 1076, 2 (left column, third paragraph); Ex. 1007, 3); and
- wasting network and computing resources by sending highly fragmented data in many small packets (Ex. 1007, 3-4).

There is no dispute that a POSA at the time of the '015 Patent's date of invention in April 2007 would have been aware of each of the problems associated with using non-persistent connections identified above. In fact, when asked during his deposition whether a POSA would have understood that the TCP three-way handshake causes some latency in establishing a new TCP connection, Mr. de la Iglesia did not dispute this fact. Ex. 1099, 30:2-14.

30. These known problems with using non-persistent connections in HTTP/1.0 led to enhancements of the HTTP/1.0 specification (sometimes referred to as the HTTP/1.0+ specification) that enabled the use of persistent connections that were kept alive using what was referred to as a "Keep Alive" feature, which allowed the same connection to remain open for multiple requests. Ex. 2004, 3-4; Ex. 1074, 161-162 (summarizing the operation of HTTP/1.0's keep-alive feature); Ex. 1075, 5 (explaining that features added to an extended version of the HTTP/1.0 specification, the HTTP/1.0+ specification, included "long-lasting 'keep-alive' connections," which "became unofficial, de facto standards"); Ex. 1076, 2 (left column, seventh paragraph; "The 'Keep-Alive' extension to HTTP/1.0 is a form of persistent connections.").

31. The known problems with using non-persistent connections in HTTP/1.0 also led to the adoption of persistent connections as the default type of connection in the official HTTP/1.1 specification published in 1997 only a year after

the publication of the HTTP/1.0 specification in 1996. Ex. 1074, 7 (explaining that the purpose of publishing the updated HTTP/1.1 specification included the HTTP/1.0's failure to "sufficiently take into consideration ... the need for persistent connections") and 161 ("Persistent connections are the default for HTTP/1.1 messages"); *see also* Ex. 2003, 5 ("The default mode of HTTP/1.1 uses persistent connections with pipelining."); Ex. 2004, 4 ("In HTTP/1.1, the persistent connection feature changed so that it became the default."); Ex. 2005, 44 ("HTTP uses persistent connections in its default mode") and 47 ("The default mode of HTTP uses persistent connections with pipelining."); Ex. 1076, 2 (left column, fourth paragraph; "HTTP/1.1 leaves the TCP connection open between consecutive operations"); Ex. 1077, 4 ("an HTTP/1.1 client makes a single persistent connection with the server, which it leaves open for subsequent retrievals, thus solving the [known] problems" with HTTP/1.0's non-persistent connections).

32. As I have explained above, persistent connections were adopted as the default type of connection in the official HTTP/1.1 specification. Additionally, there is no dispute that, beginning in 1998, web browsers and web servers began to *implement* HTTP/1.1. Ex. 2003, 3 ("Beginning in 1998 Web servers and browsers began to implement version HTTP/1.1."); *see also* Ex. 1075, 18 ("HTTP/1.1 persistent connections are active by default," "HTTP/1.1. assumes *all* connections are persistent unless otherwise indicated," and "An HTTP/1.1 client assumes an

HTTP/1.1 connection will remain open after a response”). Nor is there any dispute that a POSA would have been aware that essentially all web browsers and web servers began to *implement* HTTP/1.1 nearly a decade before the ’015 Patent’s date of invention. Id. These undisputed facts were confirmed by Mr. de la Iglesia during his deposition:

14 Q. Sure. And do you have any reason to dispute
15 that beginning in 1998 essentially all Web browsers and
16 Web servers began to implement HTTP/1.1?

17 A. That -- that is -- not only do I not have a
18 dispute; that's my personal recollection of the -- what
19 was going on at the time.

20 Q. Okay. So one of ordinary skill in the art at
21 the time of invention would have understood that, again,
22 beginning in 1998 Web servers and browsers began to
23 implement version HTTP/1.1?

24 A. I think a person of ordinary skill in the art
25 at the priority date of the patent that we're talking

1 about -- so in the 2006 time frame -- would have been
2 aware that Web servers had been using HTTP/1.1 for some
3 time. This is -- HTTP/1.1 is a transition that happened
4 in the 2000 time frame when we talk about a POSITA in
5 the time of the -- at the time of the invention. Now
6 we're thinking about the priority date of the patent.

Ex. 1099, 22:14-23:6.

33. A POSA would have understood that the transition to persistent connections as the default type of connection in the HTTP/1.1 specification was due

to recognized advantages of using persistent connections over non-persistent connections. Those advantages included:

- avoiding the slow start delay and two round trips to and from the server for every request-response transaction (Ex. 2003, 5; Ex. 1075, 8 and 11; Ex. 1076, 2 (left column, fourth paragraph); Ex. 1077, 4);
- reducing latency between requests and improving request response time by issuing back-to-back requests without waiting for responses to prior requests, a feature referred to as “pipelining” (Ex. 2003, 5; Ex. 2004, 3, 5 (Figure 4.1(b)), 9-10; Ex. 2005, 47; Ex. 1074, 43; Ex. 1075, 19-20; Ex. 1076, 2 (left column, eighth paragraph); Ex. 1077, 4); *see also* Ex. 1094, 18 (keep-alive connections can speedup latency times by 50%);
- saving processing and memory resources by opening and closing fewer connections (Ex. 1074, 43; Ex. 1077, 4);
- reducing network congestion by reducing the number of packets required to establish, use, and close connections (Ex. 1074, 43; Ex. 1076, 2 (left column, fifth paragraph); Ex. 1077, 4 (explaining that pipelined requests result in lower fragmentation and thus fewer packets)); and

- increasing throughput and utilizing more available bandwidth by allowing the slow start phase sufficient time to measure the state of the network (Ex. 2003, 5; Ex. 2004, 4; Ex. 1077, 4).

There is no dispute that a POSA at the time of the '015 Patent's date of invention in April 2007 would have been aware of each of the advantages associated with using persistent connections identified above. In fact, during his deposition, Mr. de la Iglesia acknowledged that reusing a single TCP connection to make multiple HTTP requests would have been beneficial and, further, that a POSA would have been aware of this fact. Ex. 1099, 29:16-24, 30:16-25.

34. Multiple comparative analyses conducted prior to the '015 Patent's date of invention have demonstrated the benefits of using persistent connections over non-persistent connections. For example, a study in 1997 that compared HTTP/1.1's pipelined persistent connections to HTTP/1.0's non-persistent connections found that "[f]or all our tests, a pipelined HTTP/1.1 implementation outperformed HTTP/1.0, even when the HTTP/1.0 implementation used multiple connections in parallel, under all network environments tested." Ex. 1076, 1 (left column, second paragraph) and 11 (left column, sixth paragraph); *see also id.* at 11 (left column, eighth paragraph; "The savings in terms of number of packets of HTTP/1.1 are truly

dramatic.”).³ A similar study in 1999 likewise concluded that, on both wired and wireless connections, the features of HTTP/1.1 improved throughput over HTTP/1.0 and significantly decreased the quantity of packets sent across the connections. Ex. 1077, 5-6 and 7 (“Our study has shown that on a wireless network, HTTP/1.1 doubles the throughput of HTTP/1.0, while reducing the number of packets sent by 60%.”).

35. Given the known problems with HTTP/1.0’s non-persistent connections and in view of the recognized and quantified advantages of HTTP/1.1’s persistent connections, it is my opinion that a POSA would have found persistent connections (e.g., pipelined persistent connections) to be the preferred (and thus obvious) type of connection to use in Baig-Zwicky-Damick and Baig-Satapati-Damick systems. The recognized advantages of pipelined persistent connections that I discuss above would have motivated a POSA to use that type of connection to transport the HTTP messages between Baig’s user devices and Baig’s web server providing the VCSP website. *See also* Ex. 2004, 3 (“it would be beneficial to *reuse* the TCP connections to make multiple HTTP requests over a single connection”) (emphasis in original), 7 (“A single persistent connection is more network

³ I note that this study appears to be cited in Patent Owner’s Exhibits 2003 and 2005. *See* Ex. 2003, 5 (“Nielsen 1997”); Ex. 2005, 47 (“Nielsen 1997”).

friendly.”). And as I explain further below, a POSA would have understood that Baig’s AP would have been able to use persistent connections to transport the HTTP communications between Baig’s user devices and Baig’s web server.

36. It is also my opinion that persistent connections would have been the type of connection actually used by Baig’s user devices and Baig’s web server in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems. Indeed, Patent Owner’s own exhibits show that adoption of HTTP/1.1 began almost a decade before the ’015 Patent’s date of invention in April 2007: “Beginning in 1998 Web servers and browsers began to implement version HTTP/1.1.” Ex. 2003, 3; *see also* Ex. 1075, 18 (“HTTP/1.1 persistent connections are active by default,” “HTTP/1.1. assumes *all* connections are persistent unless otherwise indicated,” and “An HTTP/1.1 client assumes an HTTP/1.1 connection will remain open after a response”).

37. As I noted above, persistent connections were adopted as the default type of connection in the official HTTP/1.1 specification, and Mr. de la Iglesia directly acknowledged during his deposition that web servers began to *implement* HTTP/1.1 in 1998. Ex. 2003, 3; Ex. 1099, 22:14-23:6. As I explain above, the exhibits relied upon by Mr. de la Iglesia in his declaration, clearly establish that the “keep-alive (persistent connection) feature allows the same connection to remain open for multiple requests.” *See e.g.*, Ex. 2004, 4. However, when directly questioned whether the keep-alive feature, in fact, allowed a persistent connection

to remain open for multiple requests, Mr. de la Iglesia made incorrect and unsupported assertions:

```
10      Q.  And then that next paragraph on Page 4 of
11 Exhibit 2004 states, "The keep-alive persistent
12 connection feature allows the same connection to remain
13 open for multiple requests"; correct?
14      A.  If it is implemented by the server directly, it
15 will allow the connection to keep open.  Most servers
16 did not respect it.
17      Q.  Okay.  But specifically looking at
18 Exhibit 2004, it states, "The keep-alive persistent
19 connection feature allows the same connection to remain
20 open for multiple requests"; correct?
21      A.  If it's supported by the server, then the --
22 that document indicates that this -- this feature allows
23 the behavior described.
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Ex. 1099, 31:10-23.

38. As shown above, Mr. de la Iglesia had no choice but to admit that if the keep-alive (persistent connection) feature is implemented by a server then that server would, in fact, permit a TCP connection to remain open for multiple requests. Mr. de la Iglesia also asserted, without any factual support or corroborating evidence, that “[m]ost servers did not respect [the keep-alive feature]” and, further, that leaving the connection open for additional requests under the keep-alive feature is simply an “anticipated behavior of the feature” but “[it] is not what happens in real life.”

Ex. 1099, 31:10-23, 36:14-37:3. However, as I explain below, Mr. de la Iglesia's assertions are incorrect.

39. Despite Mr. de la Iglesia's assertions otherwise (Ex. 1099, 32:24-33:21, 36:14-37:3, 52:9-24), web servers that existed at the time of the '015 Patent's date of invention in April 2007 supported HTTP/1.1's persistent connections to handle multiple request-response transactions. *See* Ex. 1092, 46 (administrator's guide for HTTP server explaining that the "KeepAlive" parameter "Enables HTTP 1.1 keep-alive support, allowing reuse of the same TCP connection for multiple HTTP requests from a single client," which defaulted to "On"); Ex. 1093, 4 and 5 (manual for Apache's open-source web server, Tomcat, published in 2004 discussing its use with Microsoft's popular Internet Information Services (IIS) web server and explaining that "The default IIS configuration has HTTP keep-alive enabled." and "When the HTTP keep-alive attribute is enabled, the Web server keeps the TCP connection open for a specified period of time to optimize performance for back-to-back HTTP requests between a client and the Web server."); Ex. 1094, 18 ("KeepAlive Directive" for Apache HTTP Server Version 2.0). I further note that, contrary to Mr. Iglesia's contentions during his deposition (Ex. 1009, 38:16-39:21), web browsers that existed at the time of the '015 Patent's date of invention in April 2007 supported HTTP/1.1's persistent connections. Ex. 1095, 1-2 (explaining that version 4.0 of the Opera web browser released in 2000 included HTTP/1.1's

pipelined persistent connections); Ex. 1098, 5 (indicating support for pipelining in the Firefox web browser).

40. During his deposition, Mr. de la Iglesia claimed that a POSA at the time of the '015 Patent's date of invention would not have understood that the keep-alive feature allows the same connection to remain open for multiple requests because "a person of ordinary skill in the art at the time of the invention would know, for example, that the predominant server, Microsoft Internet server, did not respect keep alive and actually reset pounded connections to not allow them to stay open." Ex. 1099, 32:13-33:8, 52:9-24. In addition to providing no factual basis to support this assertion, Mr. de la Iglesia's claims concerning the capabilities of Microsoft Internet Information Services (IIS) server are incorrect and directly contradicted by the prior art. *See* Ex. 1093, 5 (manual for Apache's open-source web server, Tomcat, published in 2004 explaining that "The default IIS configuration has HTTP keep-alive enabled." and "When the HTTP keep-alive attribute is enabled, the Web server keeps the TCP connection open for a specified period of time to optimize performance for back-to-back HTTP requests between a client and the Web server."). Notably, although Mr. de la Iglesia claimed during his deposition that a POSA would know whether the keep-alive feature was supported by the Microsoft IIS server (Ex. 1099, 32:13-33:8, 52:9-24), 43-44, it is instructive that he himself

was not aware that the IIS server, in fact, supported the keep-alive feature at the time of the '015 Patent's date of invention.

41. With persistent connections being the obvious (and actual) type of connection used in Baig's system, I disagree with Mr. de la Iglesia's and Patent Owner's conclusions that the ports Baig's AP assigned to the connections from Baig's user devices "would have been typically assigned only seconds earlier and persist only for so long as needed to complete a data transfer during a given connection" and that an assigned port "would have been reassigned quickly, likely only a few seconds later." Ex. 2001, ¶34; POR 12.⁴ Here again Mr. de la Iglesia and Patent Owner undermine any view of what Baig's AP necessarily would have done by asserting how ports "**typically**" would have been assigned. Ex. 2001, ¶34 (emphasis added); POR 12. The evidence also contradicts Mr. de la Iglesia's and Patent Owner's assertions, which shows that APs that existed at the time of the '015

⁴ For the same reasons, I disagree with Mr. de la Iglesia's and Patent Owner's assertions regarding the use and assignment of port numbers in Baig specifically. *See, e.g.*, Ex. 2001, ¶35 ("The set of port numbers in a system such as Baig would change rapidly over time ..." and "At different moments within a same user's login session, the set of port numbers will change and the same port numbers used before the change allocated for a different device."); POR 13.

Patent's date of invention in April 2007 kept connections open at least for a defined idle period (e.g., five minutes). Ex. 1085, 198.

42. Given the availability of persistent connection and the availability of APs that kept open any connections between a client device and a web server, a POSA would have recognized that it would have been feasible to create an electronic database containing multiple associations between device identifiers formed by combining a common IP address and assigned port number contrary to Mr. de la Iglesia's and Patent Owner's conclusions otherwise. Ex. 2001, ¶34; POR 13. As I explained in my original declaration, "it would have been obvious that Baig's content server 124 would have stored such device identifiers in '**an electronic database,**' in order to keep track of the users that belong to a vicinity-based user group, to produce a list of current users in the VCSP group that are connected to a particular hotspot (e.g., list 606 in Figure 6), and to ensure that VCSP services are appropriately provided and/or addressed to user devices 102." Ex. 1002, ¶364. Mr. de la Iglesia's and Patent Owner's conclusions regarding the feasibility of creating such a database assumes without justification that a client device's web browser necessarily would have used multiple port numbers simultaneously to connect to Baig's web server. *See* Ex. 2001, ¶34; POR 13. Mr. de la Iglesia and Patent Owner do not dispute and, in fact, acknowledge that a port number is assigned to an individual TCP connection for the duration of that connection. Ex. 2001, ¶32; POR

10. In other words, the port number assigned to a TCP connection will remain the same (i.e., will not change or be recycled) until that connection is subsequently closed. Accordingly, a POSA would have recognized that using a single, persistent connection to connect the web browser of Baig's user device to Baig's VCSP web server would have avoided the concerns that Mr. de la Iglesia and Patent Owner raise, namely because the port number assigned to that persistent connection would reliably remain the same.

43. To the extent Mr. de la Iglesia and Patent owner take the position that any private/dynamic port number is "ephemeral" in the sense that the connection assigned that port number is short-lived (e.g., non-persistent), I disagree. *See* Ex. 2001, ¶35 ("The source port number that Baig's content server will observe from any given connection will be an ephemeral port (sometimes called a dynamic/private port") (citing Ex. 2006, 1); POR 13-14. A POSA would have understood that a dynamic/private port is simply an unreserved port that is available to assign to a TCP connection. Ex. 2006, 1; Ex. 1006, ¶2. Whether that connection and its assigned port is short-lived or persists would depend on whether the connection is configured as a non-persistent connection or a persistent connection as I describe above. As I explain above, a POSA would have understood that a private/dynamic port assigned to a persistent connection would have persisted throughout the duration of the connection until explicitly closed by one side of the connection and not be "ephemeral" (i.e.,

short-lived). For this reason, I disagree with Mr. de la Iglesia's and Patent Owner's conclusion that "Baig's content server would not be able to use the chosen source port of the NAT layer of the Wi-Fi Access Point to determine whether a given communication relates to a specific user or device." Ex. 2001, ¶35; POR 14.

44. A POSA would have appreciated that Baig's system, configured to use persistent connections, would have been able to reliably determine that any communication received via a persistent connection came from the device identified by the common IP address and port number assigned by Baig's AP. In other words, Baig' server would have been able to reliably understand that communications associated with the same IP address and the same source port were transported by the same persistent connection and thus originated from the same user device. As I explained in my original declaration, "packets sent over the Internet include not only the **IP addresses** of the source and destination devices, but also source and destination **port numbers**, which are used to identify an endpoint associated with the source and destination IP addresses." Ex. 1002, ¶342. Thus, Baig's server would have been able to reliably identify a user device originating communications associated with the same IP address and the same source port that were transported by the same persistent connection. *Id*; *see also* Ex. 1007, ¶¶43-47; Ex. 1002, ¶¶340, 347 ("[t]he combined common IP address of the modified Baig system's access point to which a device was connected and the port number associated with the device (as

was a known part of NAT and taught by Satapati and Zwicky) thus provide a ‘**device identifier**’ because, together, they uniquely identify a particular mobile device that seeks to connect with the content server in Baig.”).

45. For these reasons, I further disagree with Mr. de la Iglesia and Patent Owner that a POSA “would not program a system like Baig’s content server assuming that the same source port can be re-used by a given device over any given period of time, but would instead proceed under the assumption that the source port number would change from moment to moment depending on the needs of the system performing the NAT translation.” Ex. 2001, ¶36; POR 14-15. I note that Patent Owner’s own exhibit explains that application developers are faced with the choice of choosing either non-persistent connections or persistent connections when implementing the mechanism for client-server interactions over TCP:

In many Internet applications, the client and server communicate for an extended period of time, with the client making a series of requests and the server responding to each of the requests. Depending on the application and on how the application is being used, the series of requests may be made back-to-back, periodically at regular intervals, or intermittently. When this client-server interaction is taking place over TCP, the application developer needs to make an important decision—should each request/response pair be sent over a *separate* TCP connection, or should all of the requests and their corresponding responses be sent over the *same* TCP connection? In the former approach, the application is said to use **non-persistent connections**; and in the latter approach, **persistent connections**. To gain a deep understanding of this design issue, let’s examine the advantages and disadvantages of persistent connections in the context of a specific application, namely, HTTP, which can use both non-persistent connections and persistent connections. Although HTTP uses persistent connections in its default mode, HTTP clients and servers can be configured to use non-persistent connections instead.

Ex. 2005, 44 (annotated)

In my opinion, when looking to design or implement a communications network and/or network-based content delivery system, a POSA would need to determine what type of TCP connections would be used to transfer data between devices in the network, and that POSA would have been faced with two options to select from: either non-persistent connections or persistent connections. Mr. de la Iglesia and Patent Owner do not attempt to reconcile (i) their conclusions about what a POSA would have assumed when programming Baig's system with (ii) the evidence on record explaining that persistent connections were the default type of connection for HTTP/1.1, which web browsers implemented almost a decade prior to the '015 Patent's date of invention in April 2007. Ex. 2003, 3. Given the adoption of HTTP/1.1 and persistent connections as the default type of connection for HTTP communications at the time of the '015 Patent's date of invention in 2007, it is my opinion that a POSA would have programmed Baig's system under the safe assumption that TCP connections to Baig's web server would have been persistent connections and their assigned port numbers would have persisted throughout the duration of the connection. Because a POSA would have understood that Baig's server would have been configured to implement persistent connections, as Mr. de la Iglesia conceded during his deposition, the persistent connections used in Baig's system would have remained open for multiple requests. Ex. 1099, 31:10-23. The existence of APs that existed at the time of the '015 Patent's date of invention

in April 2007, which respected the persistence of those connections by keeping them open so long as there was active traffic, supports this understanding. Ex. 1085, 198 (wireless AP's idle period for active connections). Mr. de la Iglesia provides nothing but his unsupported testimony to believe otherwise. *See* Ex. 2001, ¶36.

46. Programming Baig's system would not, as Mr. de la Iglesia and Patent Owner seem to suggest, require "reverse-engineer[ing] the constantly changing connection table ports of a Wi-Fi access point." Ex. 2001, ¶36; POR 14. As I explain above, due to the adoption of HTTP/1.1 and its persistent connections, Baig's server would have been able to assume that respective connections with Baig's user device were persistent connections and that the respectively assigned port numbers would have persisted throughout users' respective sessions with Baig's VCSP website. In particular, as I explained in my original declaration, port address translation uses port numbers "to allow multiple devices to share a common public IP address by using the port numbers to further identify the different devices that use the same public IP address." Ex. 1002, ¶343. Thus, Baig's AP 106 (comprising NAT 108) would send over the Internet to Baig's server data packets that include the source IP address of the AP as well as the source port number assigned to the persistent connection used to transfer HTTP communications from a specific user device. Ex. 1002, ¶¶341-346; Ex. 1007, ¶¶ 43-47; Ex. 1012, 35-38; Ex. 1006, ¶¶2, 4, 11. Baig's server, therefore, would have been able to (i) safely conclude that any HTTP

communications transported via a given persistent connection originated from a specific user device and (ii) associate its device ID (combination IP address/port number) with other device IDs having the same IP address to indicate which devices connected to Baig’s VCSP website from the same AP and thus belonged to the same VCSP community. *See e.g.*, Ex. 1002, ¶¶357-361.

47. Mr. de la Iglesia’s reliance on the “Session Initiation Protocol” (SIP) does not suggest otherwise. Ex. 2001, ¶36 (citing Ex. 2007). The SIP specification explains that it is “an application-layer control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants” whereby “SIP invitations used to create sessions carry session descriptions that allow participants to agree on a set of compatible media types.” Ex. 2007, 1 and 2. A POSA would understand that the SIP specification’s teachings regarding the reuse of transport layer connections are specific to SIP implementations and are not intended to be generalized to the operation of transport layer connections or TCP connections in all circumstances and all scenarios. *See id.* at 142-143. Mr. de la Iglesia’s does not otherwise explain why or how the SIP specification is relevant to Baig generally, which does not indicate or suggest that its system requires or uses SIP to provide the VCSP website of the VCSP services, or to the Baig-Zwicky-Damick and the Baig-Satapati-Damick systems specifically. Even so, the SIP specification’s teaching that connections can be kept open for a period of time to receive additional data

contradicts Mr. de la Iglesia's and Patent Owner's assertion that a POSA would not assume the same source port can be reused. *Compare* Ex. 2001, ¶36 ("a POSITA would not program a system like Baig's content server assuming that the same source port can be re-used by a given device over **any** given period of time" (emphasis added)) *with* 36 fn.3 ("when Baig's content server has last observed data being sent or received over a connection, Baig's content server should still continue listening for data being passed over the connection just in case the source application (i.e., the user's browser) attempts to transmit more data within a given period of time"); *see also* POR 14-15.

48. As to the type of connections suitable for use with Baig's VCSP website, it is my opinion that a POSA would have recognized pipelined persistent connections between Baig's user devices and its web server would have been a suitable and obvious choice. For example, a POSA would have been aware that a pipelined persistent connection performed better than multiple parallel connections. Ex. 1076, 1 (left column, second paragraph; "pipelined HTTP/1.1 implementation outperformed HTTP/1.0, even when the HTTP/1.0 implementation used multiple connections in parallel, under all network environments tested"); Ex. 1077, 4 ("Having a single persistent, pipelined connection allows the HTTP/1.1 to reach a throughput approaching the bandwidth of the network"). A POSA also would have known that a single persistent connection yield better performance than multiple

persistent connections. *See* Ex. 2004, 8-9 (explaining that “the benefit of [several] persistent connections is reduced by the fact that there will be fewer requests made over each persistent connection (since there are more connections among which the requests are divided)”), 9-10 (“Pipelining considerably improves performance” of a persistent connection).

49. As I noted above, the very exhibits that Mr. de la Iglesia relies upon for his declaration clearly disclose the existence of persistent, pipelined connections and, further, that pipelined connections were known to reduce latency. *See* Ex. 2004, 9-10; Ex. 2003, 5. When questioned at his deposition regarding whether request pipelining was added to HTTP/1.1 to be used with persistent connections, Mr. de la Iglesia acknowledged that pipelining was added to HTTP/1.1. Ex. 1099, 38:16-39:13. Mr. de la Iglesia then asserted that the request pipelining feature for persistent connections “was not added to browsers,” and that based on his responsibility for implementing compliance with this feature at his job, WebStacks, he “authoritatively determined that none of the browsers supported this [feature].” *Id.* at 38:16-39:13, 53:25-54:8.

50. Mr. de la Iglesia’s assertion that the request pipelining feature was not added to browsers is factually inaccurate. As I discussed above, web browsers that existed at the time of the ’015 Patent’s date of invention in April 2007 supported HTTP/1.1’s persistent connections, including the pipelining feature. Ex. 1095, 1-2

(explaining that version 4.0 of the Opera web browser released in 2000 included HTTP/1.1's pipelined persistent connections); Ex. 1098, 5. Additionally, to the extent Mr. de la Iglesia previously determined that web browsers did not implement persistent pipelined connections, which I do not concede to be true and no evidence has been provided to corroborate this statement as of the '015 Patent's date of invention (i.e. April 2007), a POSA would have been well aware by April 2007 that many browsers implemented persistent, pipelined connections. Ex. 1095, 1-2; Ex. 1099, 38:22-39:13.

51. In fact, a number of statements made by Mr. de la Iglesia during his deposition appear to be founded based on his knowledge and technical expertise relating to his time at WebStacks. To the extent that Mr. de la Iglesia is relying on his experience at WebStacks to form these opinions, I note that Mr. de la Iglesia's employment at WebStacks ended in September 2003, nearly four years before the '015 Patent's date of invention. For example, referring to his time at WebStacks around 2003, Mr. de la Iglesia asserted during his deposition that persistent, pipelined connections "were incredibly difficult for software implementations to do *at the time* because of the processing constraints so that's one of the reasons we had to move to a hardware-based implementation." Ex. 1099, 10:24-11:15 (emphasis added). This timeframe precedes the relevant timeframe for a POSA. *See* Pet. 2 ('015 Patent's priority date is in April 2007); POR 12 and 17 (Patent Owner's

acknowledgment that April 2007 is the relevant timeframe); Ex. 1099, 10:24-12:4, 38:22-39:13, 48:23-49:9 (Mr. de la Iglesia testifying that his time at WebStacks was from March 2000 until September 2003); Ex. 2001, ¶10.

52. A POSA also would have recognized that persistent connections would have been a suitable and obvious type of connection to use in Baig's system for HTTP communications with Baig's VCSP website given its arrangement as a collection of webpages and the understanding that "multiple [w]eb pages residing on the same server can be sent from the server to the same client over a single persistent TCP connection." Ex. 2005, 47; Ex. 2003, 5. As I explained in my original declaration, "Baig provides the communication services through a vicinity-based service provider (VCSP), hosted by a server, that provides web pages for users of the devices to access information and services on the Internet." Ex. 1002, ¶92; *see also* Ex. 1007, ¶¶16-25 (describing the various graphical user interfaces of Baig's web pages illustrated in Figures 4-13), 53 ("the server 224 provides web pages for user access to information, as well as interactive and non-interactive services"), 59 ("The user can then access various web pages from the VCSP website to participate or receive particular service[s] offered by the VCSP 202."), 67 ("FIGS. 4-23 illustrate various web pages from the website provided by the VCSP 202 over the public network (i.e., Internet).").

53. As I also explained in my original declaration, “Baig discloses using an identified association to cause cross-device actions by offering services that facilitate interactions between users based on an association with a common access point (AP) hotspot” (Ex. 1002, ¶325) and “Baig’s VCSP offers a combination of various services via its website.” Ex. 1002, ¶359; *see also* Ex. 1002, ¶360; Ex. 1007, ¶¶2, 8-10, 52-54, 67-93, 112-113, FIGS. 6-13. As further explained in my original declaration, the various services offered by Baig’s VCSP website include, among others, a chat-room service, online video games, lost and found services, and online marketplace (e.g., buy/sell or barter). Ex. 1002, ¶¶360, 389, 391, 413, 415.

54. A POSA further would have recognized that persistent connections would have been a suitable and obvious type of connection to use in Baig’s system given the interactive nature of Baig’s website that provides asynchronous, real-time updates to the web pages displayed to the users connected to the same VCSP community. *See e.g.*, Ex. 1007, ¶¶5-6, 8-10, 53-54, 59, 62, 79-82, 85-88, 90, 92-93, 107-110, 124, 125-128, Abstract, FIGS. 7-12. As I explained in my original declaration, “a POSA would understand that to provide VCSP services in real-time, Baig’s VCSP website would have automatically updated or refreshed the webpage (e.g., the webpages shown in Figure 6 and Figure 7 of Baig) being displayed to a user” and, further, that “automatically displaying and/or updating information presented via a web browser was conventional web-based technology and well

known at the time the '015 Patent was filed.” Ex. 1002, ¶415. Such updates to Baig’s VCSP web pages would include displaying new chat messages in the VCSP community chat room, modifying the user list as users join and leave the VCSP community or toggle their visibility, issuing video game challenges, and exchanging instant messages. *See* Ex. 1007, ¶¶19 (“FIG. 7 illustrates a graphical user interface of a webpage for participating in a chat room with other members”), 81 (“A link 720 can also be provided to remove [users’] concealment (i.e., invisibility) to other users.”), 109 (“User A wishes to play chess with someone at the hotspot and sends a chess challenge to all online users at the hotspot.”), 124 (“chat-room service includes instant messaging”); *see also id.* at Abstract (indicating Baig’s website provides its VCSP services “in real time to end-users”). A POSA also would have known that TCP connections were full-duplex and point-to-point enabling two-way communications between Baig’s server and the user devices connected to Baig’s VCSP website. Ex. 1096, 4; Ex. 2005, 38 (explaining that a client and server with an active TCP connection “can send messages to each other over the connection at the same time”).

55. A POSA equipped with this knowledge would have understood that persistent connections were well-suited to transport Baig’s asynchronous, real-time updates to the individual user devices connected to the VCSP website and would have been aware of available techniques to provide those updates from Baig’s VCSP

website to the connected user devices including server push techniques and client pull techniques. *See, e.g.,* Ex. 1078, 5, 86-98 (explaining how to implement server-sent events such as status updates); Ex. 1079, 1, 4-5 (discussing operation of server pushes for dynamic documents), 6 (noting that server pushes over connections held open are suitable for servers that accepted “dedicated allocation of a TCP/IP port”); Ex. 1082, 6 (noting that existing web browsers supported client pull and server push functionality), 6-8 (discussing client pull techniques), 8-10 (discussing server push techniques); Ex. 1083, 5 (praising the use of persistent connections as enabling a server to “send[] data to the client when new information is available”).

56. Given that users’ interactions with Baig’s VCSP website (e.g., logging on/off, toggling visibility, sending chat or instant messages, playing video games, etc.) would have occurred at random times and required sending updates to the other users belonging to the same VCSP community, a POSA would have found it beneficial to keep connections open between Baig’s web server and the connected user devices in order to push updates to the community members’ user devices as they happen in real-time or allow user’s web browsers to periodically refresh the VCSP website in order to receive any updates from other VCSP community members. In my opinion, a POSA would have found it preferable to leave open the connection between Baig’s web server and the connected user devices, which would have avoided the delays associated with opening multiple connections to receive

updates, maximized the available bandwidth of the connection after the initial slow start phase, and allowed for pipelining of HTTP communications. *See* Ex. 2003, 5; Ex. 2004, 3, 5, 9-10; Ex. 2005, 47; Ex 1074, 43; Ex. 1075, 8, 11, 19-20; Ex. 1076, 2; Ex. 1077, 4 (discussing advantages of using persistent connections). A POSA would have recognized, therefore, that persistent connections that remained open would have been well-suited to transport those updates from Baig’s web server to the user devices.

57. To the extent Mr. de la Iglesia and Patent Owner takes the position that “opening multiple simultaneous connections” would have been the only option for Baig’s VCSP website, I disagree. Ex. 2001, ¶37; POR 15. As I explain above, a POSA would have recognized that pipelined persistent connections would have been well-suited for Baig’s VCSP website. Even if Mr. de la Iglesia were to argue that “multiple simultaneous connections” would have been the better choice, a POSA would have understood that pipelined persistent connections nevertheless were a suitable and obvious type of connection to use.

58. I otherwise note that Mr. de la Iglesia’s provides no evidence to support his assertion that “[i]ntermediate NAT systems at the time did (and still do) need to tear down ephemeral ports quickly.” Ex. 2001, ¶37. In particular, Mr. de la Iglesia cites to nothing that discusses the operation of “[i]ntermediate NAT systems” that existed either before or after the ’015 Patent’s date of invention in April 2007. *See*

id. Furthermore, Mr. de la Iglesia's assertion appears to be premised on the assumption that web browsers necessarily would have opened multiple, parallel connections. *Id.* ("browsers **would** open more and more parallel connections") (emphasis added). As I explain above, the web browsers at the user devices in Baig would not have necessarily opened multiple, parallel connections with Baig's web server given the option to use pipelined persistent connections with their recognized advantages. Mr. de la Iglesia also overstates the need to "quickly and efficiently recycl[e] ephemeral port numbers." *Id.* As I explain above, hundreds to thousands of port numbers would have been available for each user device connecting to Baig's web server. The quantity of port numbers available to Baig's AP, therefore, is not as limited as Mr. de la Iglesia suggests, especially when using persistent connections between Baig's user devices and web server. *Id.* ("The limited number of ports ... makes such recycling of ephemeral ports especially important.").

59. A POSA would have understood that using persistent connections rather than non-persistent connections that closed after each request-response transaction would have avoided the concerns Mr. de la Iglesia and Patent Owner raise about external knowledge "becom[ing] stale and incorrect very quickly." Ex. 2001, ¶38 (asserting that "ephemeral ports **may** have been recycled on the order of seconds") (emphasis added); POR 15. A POSA would have appreciated that a port number assigned to a persistent connection would have persisted throughout the

duration of that connection as long as it was kept open. A POSA further would have recognized that, because a persistent connection must be explicitly closed by one side of the connection by issuing a connection close command, either Baig's web server or AP would have issued the command to close the persistent connection to a user device (e.g., after a period of inactivity) or the user device would have closed the persistent connection (e.g., when logging out of Baig's VCSP website). Ex. 2003, 5 ("Typically, the HTTP server closes the connection when it isn't used for a certain time (the timeout interval), which is often configurable."); Ex. 2005, 117 ("Either a server or a client may close a transport connection between them if either one detects the connection has been idle for some time."); Ex. 1074, 44 ("Persistent connections provide a mechanism by which a client and a server can signal the close of a TCP connection."); Ex. 1075, 11 ("Persistent connections stay open across transactions, until either the client or the server decides to close them."); Ex. 1085, 198 (indicating example AP will time out idle TCP connections after five minutes); Ex. 1097, 3-4 (discussing different approaches for terminating TCP sessions at NAT devices, which can stay open for extended periods of time including up to 24 hours, and indicating that idle period timeouts should be configurable at NAT devices); Ex. 1090, 92 (discussing that interval between keep-alive signals is configurable and must "default to no less than two hours"); Ex. 1088, 4 (discussing that default idle time for a TCP connection is typically two or three hours).

60. Given the use of persistent connections in Baig's system and the knowledge that the port number assigned by the AP would have persisted throughout the duration of that connection, a POSA would have found the combined IP address and port number to reliably identify a user device connected to Baig's web server contrary to Mr. de la Iglesia's and Patent Owner's assertions otherwise. Ex. 2001, ¶38 ("IP address/port number combinations would have been extremely unreliable for device-identification purposes" and "no POSITA would have considered using such a combination as a device identifier"); POR 15-16. Mr. de la Iglesia's and Patent Owner's conclusions about what a POSA would have considered and found to be feasible is based on a view of the Baig-Zwicky-Damick and Baig-Satapati-Damick systems that unnecessarily constrain those systems to using multiple, parallel, non-persistent connections despite the advantages of using respective pipelined persistent connections that a POSA would have been well aware of. Ex. 2001, ¶38; POR 15-16. With the combined IP address and port number of such persistent connections being able to reliably identify Baig's user devices, it is my opinion that a POSA would have recognized the feasibility of using the combined IP address and port number as a device ID and the feasibility of associating them with each other in order to indicate the user devices that belong to the same VCSP community when accessing the Internet from the same AP.

61. Due to the persistent nature and device-identifying capability of the combined IP address and port number of a persistent connection, there would have been no need for Baig's web server to "receive information about the WiFi access point's mapping of inbound and outbound port numbers" as Mr. de la Iglesia asserts. Ex. 2001, ¶39. With each combined IP address and port number associated with a persistent connection corresponding to a specific one of Baig's user devices, Baig's web server would have been able to map HTTP communications from the common IP address (e.g., 128.22.99.144) to different user devices based on the port number assigned to the persistent connection between Baig's web server and the AP (e.g., 128.22.99.144:50001 for a first user device, 128.22.99.144:5001 for a second user device, etc.) that corresponded to the persistent connection between the AP and Baig's user devices. See Ex. 1006, FIG. 1 (providing example of public-facing IP address translated from private-facing IP address); Ex. 1002, ¶¶333, 338 (providing additional examples of port translation). For these reasons, a POSA would have recognized that, when using persistent connections, the combined IP address and port number would have served the "device-identification purpose" that Mr. de la Iglesia and Patent Owner assert is required by the claimed "identifier of a ... device." Ex. 2001, ¶40; POR 15-16. A POSA further would have understood that a combined IP address and port number, when associated with a persistent connection, would have made it "'highly []likely' to identify a particular device

accurately such that it ‘can enable accurate directing of [] ads to the correct’ device.” Ex. 2001, ¶40 (quoting Ex. 1001, 16:4-13). As I explained in my original declaration, “[t]he combined common IP address of the modified Baig system’s access point to which a device was connected and the port number associated with the device (as was a known part of NAT and taught by Satapati and Zwicky) thus provide a “device identifier” because, together, they uniquely identify a particular mobile device that seeks to connect with the content server in Baig.” Ex. 1002, ¶347.

62. For these reasons, Mr. de la Iglesia is incorrect that a POSA would have understood it was necessarily the case that “an IP address / port number combination identifies multiple devices on the same WiFi access point over a short period of time” because, again, Mr. de la Iglesia’s assertion relies on using non-persistent rather than persistent connections. Ex. 2001, ¶¶38, 41. As I explain above, a POSA would have understood that the combined IP address and port number would have been able to reliably identify a user device in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems when using persistent connections because the port number assigned to that persistent connection would have persisted throughout the duration of the connection, which would have remained open so long as there was active traffic across the connection. Ex. 1085, 198 (description of idle time out period in Table 53); Ex. 1097, 3-4 (discussing TCP connections that persist at NAT devices). Mr. de la Iglesia’s assertion that a POSA “would have had no motivation

to use that combination as a device identifier” does not account for what a POSA would have been motivated to do when using persistent connections in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems and instead unnecessarily assumes port numbers would have been quickly recycled by Baig’s AP. Ex. 2001, ¶¶38, 41.

63. Contrary to Mr. de la Iglesia’s and Patent Owner’s assertion that “there would have been no reason for a POSITA to *retain or store* associations between IP address/port number combinations in a database” (Ex. 2001, ¶42; POR 16), a POSA would have understood that, when using persistent connections, a combined IP address/port number would have reliably identified individual user devices and thus would have been an efficient and reliable way to determine which of Baig’s user devices logged into to its VCSP website from the same AP and thus were co-located with each other in order to include them in the same VCSP community. As I explained in my original declaration, “it would have been obvious that Baig’s content server 124 would have stored such device identifiers in ‘an electronic database,’ in order to keep track of the users that belong to a vicinity-based user group, to produce a list of current users in the VCSP group that are connected to a particular hotspot (e.g., list 606 in Figure 6), and to ensure that VCSP services are appropriately provided and/or addressed to user devices 102.” Ex. 1002, ¶364.

64. While Mr. de la Iglesia and Patent Owner assert that a combined IP address and port number would have allowed for routing communications to different devices but not identifying different devices, their assertion requires limiting the Baig-Zwicky-Damick and Baig-Satapati-Damick systems to using non-persistent connections where port numbers would have been rapidly reassigned. Ex. 2001, ¶43; POR 16. But as I have explained above, there is no reason to limit the Baig-Zwicky-Damick and Baig-Satapati-Damick systems to non-persistent connections given the availability of persistent connections and all the advantages they provide over non-persistent connections. A POSA, being aware of persistent connections and their advantages, would have understood that a combined IP address and port number would have served the dual purpose of routing communications to the appropriate device and serving as an identifier for that device throughout the duration of the persistent connection. A POSA, therefore, would have found a combined IP address and port number to be a suitable device ID and suitable for creating associations with other device IDs in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems in order to group the user devices belonging to the same VCSP community.

65. Mr. de la Iglesia and Patent Owner also appear to mischaracterize my testimony regarding “well-known and industry-standard NAT techniques.” Ex. 2001, ¶44; POR 17. I never argued that using a combined IP address/port number

for device identification was well-known or industry standard. Rather, I explained that a POSA would have used well-known and industry-standard NAT techniques in order to implement the proposed combination (Ex. 1002, ¶¶335, 354-355), which showed that a POSA would have found it obvious to use a combined IP address and port number as a device ID in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems. In other words, my testimony explained that a POSA would have been able to use well-known industry standards to successfully implement the obvious combination that used a combined IP address and port number as the device ID. For the reasons I provide above, I disagree with Mr. de la Iglesia's and Patent Owner's assertion that a POSA would have "actively avoided" using a combined IP address and port number in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems. Ex. 2001, ¶44; POR 17-18. To reiterate, Mr. de la Iglesia's and Patent Owner's assertions are premised on using non-persistent connections, but a POSA would have found that using a combined IP address and port number for device identification purposes would have been reliable when using persistent connections and thus would have found that doing so in the Baig-Zwicky-Damick and Baig-Satapati-Damick systems would have been practical.

VI. CONCLUSION

66. I believe that all of the statements made in this Declaration of my own knowledge are true. All statements made herein based on information and belief are believed to be true. These statements are made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and these statements are made with the knowledge that willful false statements may jeopardize the validity of the subject patent, it being understood that my final draft of this declaration is being submitted on my behalf via counsel.

Date: 3/5/2025



David B. Lett

APPENDIX A

References I considered include:

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- Ex. 1004: Certified Prosecution History for U.S. Patent No. 11,564,015
- Ex. 1005: Excerpts from Case Docket of *Meta Platforms Inc v. AlmondNet Inc et al.*, IPR2022-00773 (March 28, 2022)
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- Ex. 1007: U.S. Patent Application Publication No. 2008/0113674 (“Baig”)
- Ex. 1008: U.S. Provisional Patent Application No. 60/858,204 (“Baig Provisional”)
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- Ex. 1015: U.S. Patent Application Publication No. 2006/0265507 (“Banga507”)
- Ex. 1016: U.S. Patent Application Publication No. 2006/0271690 (“Banga690”)
- Ex. 1017: U.S. Patent Application Publication No. 2006/0242294 (“Damick”)
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- Ex. 1042: Excerpts from Harley Hahn, *The Internet Complete Reference* (2d ed. 1996) (“Hahn”)
- Ex. 1043: U.S. Patent Application Publication No. 2003/0066085 (“Boyer”)
- Ex. 1044: U.S. Patent Application Publication No. 2007/0217436 (“Markley”)
- Ex. 1045: U.S. Patent Application Publication No. 2006/0230427 (“Kunkel”)

- Ex. 1046: U.S. Patent No. 6,543,052 (“Ogasawara”)
- Ex. 1047: U.S. Patent Application Publication No. 2002/0145621 (“Nguyen”)
- Ex. 1048: Excerpts from *Computer Dictionary*, Microsoft Press (2d ed. 1994)
- Ex. 1049: Excerpts from *Webster’s New World Computer Dictionary* (10th ed. 2003)
- Ex. 1050: International Publication No. WO 2007/078283 for International Patent Application No. PCT/US2005/047230 to Ashbaugh (“Ashbaugh PCT”)
- Ex. 1051: Claim Chart (Exhibit 8) Accompanying Complaint, *AlmondNet, Inc. v. FreeWheel Media, Inc.*, Case No. 1:23-cv-00220-MN (D. Del.)
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- Ex. 1085: Exhibit 2005 filed in IPR2023-01281, User’s Guide for G-4100 v2 802.11g Wireless Hotspot Gateway, Version 1.00, Edition 1, ZyXEL (July 2006)
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