

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FREEWHEEL MEDIA, INC.,

Petitioner,

v.

INTENT IQ, LLC,

Patent Owner.

IPR2024-00419
Patent 11,564,015 B2

**DECLARATION OF ERIK DE LA IGLESIA IN SUPPORT OF PATENT
OWNER'S RESPONSE TO THE PETITION**

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true.

Executed on December 11, 2024, at Mountain View, California.



Erik de la Iglesia

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I, Erik de la Iglesia, hereby declare as follows:

I. Introduction

1. I am over the age of eighteen (18) years and otherwise competent to make this declaration.

2. I have been retained as an expert witness on behalf of Patent Owner for the above-captioned *inter partes* review (“IPR”). I understand that the petition for *inter partes* review involves U.S. Patent No. 11,564,015 (“the ’015 patent”).

3. I make this declaration based on my personal knowledge, educational background and training, consideration of the materials I discuss herein, and my expert opinions.

4. My work on this matter is being billed at my normal hourly consulting rate of \$750, with reimbursement for actual expenses. My compensation is not related to the outcome of any proceeding involving the ’015 patent. I have no personal interest in the outcome of the case.

5. In preparing this Declaration, I have reviewed and considered the ’015 patent, the ’015 patent’s prosecution history, the declaration submitted by Dr. Lett in this proceeding, the deposition transcript of Dr. Lett in this proceeding, the prior art references Dr. Lett relies on for his discussion of his invalidity theory for Ground D, and each document cited in my declaration. The scope of this

declaration is limited to Dr. Lett's analysis for his invalidity theory presented in "Ground D" of his declaration.

II. Background and Qualifications

6. My qualifications for forming the opinions given in this declaration are summarized here and are addressed more fully in my curriculum vitae, which is submitted as Exhibit 2002.

7. I hold a Bachelor of Science degree in Electrical Engineering from the University of Florida, and a Master of Science degree in Electrical Engineering from Stanford University. While at Stanford, I was an NSF Graduate Research Fellow. My graduate focus included VLSI CMOS architecture, high-speed circuit design, computer networks and protocols, and artificial intelligence. I have worked in several computer and electrical engineering related fields for over 25 years resulting in 68 issued U.S. patents that have been cited over 2850 times in USPTO patent applications. Since 2003, I have served in a number of chief architect and founder roles of companies that have been acquired or gone public. My experiences include the design or implementation of networks and network-based computation and protocol systems similar to the technology of the '015 Patent, including systems for content targeting based on user behavior across devices.

8. Between December 1997 and November 1999, I was a circuit design engineer at Intel Corporation within the Mobile and Handheld Products Group. My

responsibilities included working on several aspects of mobile processors and chipsets including clock and power distribution, dynamic clock frequency selection, and the circuit design, device simulation, and validation of such features. Until March of 2000, I worked on similar functionality within the Microprocessor Products Group for the Itanium 3 and 4 products.

9. My work in power distribution included thermal modeling and predictive control of silicon devices and their packaging such as multi-tiered cooling systems for embedded, mobile, and desktop environments. Such systems included multiple tiers of thermal sensors, active and passive thermal control systems, and the feedback and analytic firmware and software control. My models were part of the development of the Thermal Design Power (TDP) metrics used by OEM and system designers to plan thermal control solutions for consumer and industrial products.

10. Between March 2000 and September 2003, I worked as a logic designer and architect for WebStacks and, through acquisition, Extreme Networks. WebStacks built a fully hardware-based TCP and HTTP processing stack for network processing functions including load balancing, proxy processing, and content rewriting. I was responsible for the architecture and design of the HTTP processing engine including header extraction and processing.

11. Between August 2003 and August 2007, I worked as Founder, Chief Architect and Director of Engineering for Reconnex, later acquired by McAfee. Reconnex built a gigabit line-rate network security analyzer capable of classification, heuristic analysis, and policy enforcement on arbitrary protocols and content types. The Reconnex product captured and analyzed content transmitted over the internet using HTTP and other protocols, including storage protocols. Design of the Reconnex system was based on a modified and customized version of the Linux kernel which included specifically designed driver source code and interfacing between the application and kernel domains.

12. Reconnex technology was employed in the audit and compliance verticals based on its ability to quickly analyze and classify the content of transmissions and interact with protocols and communications crossing corporate and departmental boundaries. When deployed in commercial network settings, Reconnect technology was used to track IP addresses and identities of users and endpoints as well as to perform aggregation, clustering and pattern analysis of users' traffic across different network segments.

13. Between August 2007 and September 2008, I founded Strangways, a company focused on addressing messaging security for webmail and internet messaging protocols. Products and technology developed by Strangways were sold to SendMail Inc., Iron Port (Cisco), and other companies. The Strangways product

utilized a Squid caching server and ICAP content rewrite server to translate HTTP to SMTP.

14. Between September 2008 and April 2014, I worked as Chief Architect for Gridiron Systems and, through acquisition, Senior Director of Technology for Violin Memory. I held the Senior Director position with Violin Memory both before and after the company's IPO. My responsibilities included architecture and design of flash media controllers, adaptive caching design, and machine learning for application storage behavior analytics.

15. The Gridiron product was a storage accelerator used in many analytic environments such as big data architectures with constant ingest and processing of financial, consumer and IoT data. In my role as Chief Architect, I often worked with customers to implement and accelerate their analytics environments and spoke on related topics at trade shows and industry user groups. During product development, I worked with the data science team at Shopzilla to improve database and storage performance for real-time shopping recommendation and user tracking for advertising.

16. Additional information regarding my employment history and prior expert testimony is included in Exhibit 2002. As reflected in Exhibit 2002, I have consulted on several matters involving intellectual property disputes including instances of alleged patent infringement requiring analysis of source code,

reviewing and analyzing patents, writing expert reports, and testifying in court. I have testified at deposition and at trial in a number of these cases.

III. Legal Principles

A. Claim Construction

17. I understand that the first step in performing a validity analysis of the patent claims is to interpret the meaning and scope of the claims by construing the terms and phrases found in those claims. I understand that the appropriate construction of a claim term is its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent and the prosecution history.

18. I understand that standard for claim construction in an *inter partes* review is the same standard as is applied in district court proceedings.

19. I understand that a determination of the meaning and scope of the claims is a matter of law. I have been informed that to determine the meaning of the claims, one should consider the intrinsic evidence, which includes the patent's claims, written description, and prosecution history.

B. Burden of Proof

20. I understand that in an *inter partes* review, the petitioner has the burden of proving unpatentability by a preponderance of the evidence.

C. Anticipation

21. I understand that a reference is anticipated if a single prior art reference discloses each and every claim element, either explicitly or inherently, as arranged in the same way as in the claim. I understand that where even one claim element is not disclosed in a reference, a contention of anticipation fails.

22. I further understand that when a reference fails to explicitly disclose a claim element, that reference inherently discloses that element only if the reference must *necessarily* include the undisclosed claim element.

D. Obviousness

23. I understand that a combination of prior art references may render a claim obvious if, at the time of the invention, a person of ordinary skill in the art would have selected and combined those prior-art elements in the normal course of research and development to yield the claimed invention.

24. I understand that in an obviousness analysis, one should consider the *Graham* factors, including: the scope and content of the prior art; the differences between the claimed inventions and the prior art; and the level of ordinary skill in the art. I further understand the obviousness analysis is to be performed on a claim-by-claim basis. I understand that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton.

25. I understand that obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. I understand obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have been motivated to combine those references in a manner that would include all limitations of the challenged claim, and, in making that combination, a person of ordinary skill in the art would have had a reasonable expectation of success.

26. I also understand that an obviousness analysis must be conducted with awareness of the distortion caused by hindsight bias and with caution of arguments reliant upon *ex post* reasoning. For instance, I understand that when considering obviousness, I should put myself in the position of a person of ordinary skill in the field at the time of the invention, rather than considering new information that is known today, but was not known before the priority date of the challenged patent.

IV. Person of Ordinary Skill in the Art

27. Dr. Lett alleges that a person of ordinary skill in the art, as of the priority date of the '015 patent, “would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a similar discipline, and two years of experience with the design and/or implementation of network-based content delivery systems and Internet advertising.” Ex. 1002 at ¶130. He goes on to state that “In my opinion, a POSA’s skill set would have included client level and

server level programming skills. More specifically, a POSA's skill set would have included computer programming languages and markup languages (e.g., C, C++, C#, Java, JavaScript, Visual Basic.NET, HyperText Mark-up Language (HTML), XML) and knowledge of the HyperText Transfer Protocol (HTTP). A POSA's skill set would have also included client-server architecture and database design skills." Ex. 1002 ¶131.

28. For purposes of this declaration, I adopt Dr. Lett's proposed level of skill in the art, but I also note that a POSITA would have understood the details of port number recycling as part of network address translation that I discuss in more detail below, which Dr. Lett does not address in his declaration. As Dr. Lett acknowledges, "NAT techniques... were well-known and widely deployed by April 2007," and a POSITA would have been aware that a WiFi access point utilizing NAT techniques would recycle port numbers quickly, rendering them unsuitable for use as device identifiers in the manner Dr. Lett proposes. I am a person of ordinary skill in the art under this understanding, and have had that level of skill since prior to 2007.

V. Claim Construction

29. I am informed that claim construction is an exercise of interpreting disputed terms, to the extent needed to resolve any controversy between the parties. I do not believe that any terms need express construction, but instead apply

the plain and ordinary meaning of each claim term in view of the specification of the '015 patent.

VI. Rebuttal to Dr. Lett's Ground D.

30. Dr. Lett alleges that “Under the proposed combination [of Ground D], the device identifier is the combination of: (i) the common IP address of the modified Baig system's access point, and (ii) a TCP/IP port number associated with the mobile device of Baig's modified system... that is connected to the access point.” Ex. 1002, ¶333. I disagree that such a solution would have been obvious.

31. In my opinion, the combination of an IP address and a port number cannot qualify as a device identifier of the sort identified in the '015 patent, and a POSITA at the relevant time would not and could not have used IP address/port number combinations as device identifiers and, indeed, would have had been *disincentivized* from attempting to do so.

32. In the Wi-Fi access point configuration applicable to Baig, the user's originating IP address that Baig's content server would see is the public-facing IP address of the Wi-Fi access point, not any local IP address of that user's individual device. Network address translation (NAT - such as performed by the Wi-Fi access points described in Baig under Dr. Lett's proposed combination) 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. A given port number is used only for data transferred during that specific connection and must be quickly recycled to support other users after use. The lifetime of ephemeral ports is further restricted by the security settings of the NATing system and/or upstream firewalls as an active port allows return packets to cross the firewall boundary which should only be allowed when part of an active content transfer. In my opinion (and as a POSITA as of April 2007 would have recognized), assigning ports to individual devices (rather than to individual connections, the method that is and was routinely used by Wi-Fi access points) is not practical because the access point does not know how many devices will be accessing the Internet through a given access point and cannot allocate ahead of time the number of ports needed for all parallel tcp connections that might be initiated from individual devices.

33. Each user's browser accessing a system such as Baig's (via a Wi-Fi access point) would have opened a plurality of parallel HTTP connections to obtain content from the servers hosting Baig's website. For instance, a browser would have initiated on the order of 10 different HTTP connections to obtain information from a domain hosting the Baig website. *See* Keith W. Ross and James F. Kurose, *The World Wide Web: HTTP* (excerpted from *Computer Networking: A Top-Down Approach Featuring the Internet*) (2000), available at <https://userpages.umbc.edu/~dgorin1/451/OSI7/dcomm/Contents2.htm> and

<https://userpages.umbc.edu/~dgorin1/451/OSI7/dcomm/http.htm> (Ex. 2003 at 4) (“In their default modes, most browsers open five to ten parallel TCP connections, and each of these connections handles one request-response transaction.”); Ari Luotonen, *Web Proxy Servers* (Prentice-Hall 1998) (Ex. 2004) at 50 (“Many Web clients, such as Netscape Navigator, open up several connections simultaneously, so that the document text (HTML) and its inlined images can be loaded simultaneously to improve the received response time,” so that “[m]ultiple images can be rendered simultaneously, instead of having to wait for the previous one to finish before starting the next one.”). Figure 4.2 of Luotonen, on the same page, illustrates this process. A browser’s opening of plural connections, typically simultaneously, i.e., in parallel, was prevalent in the period between Baig’s earliest apparent priority date (Nov. 10, 2006, *see* Ex. 1008, the Baig provisional) and the effective filing date of the ’015 patent (Apr. 17, 2007). That same approach was prevalent both before and after that period as well. *See* James F. Kurose & Keith W. Ross, *Computer Networking: A Top-Down Approach* (Ex. 2005) at 101 (2013), *available at*

<https://broman.dev/download/Computer%20Networking:%20A%20Top-Down%20Approach%206th%20Edition.pdf> (“In their default modes, most browsers open 5 to 10 parallel TCP connections, and each of these connections handles one request-response transaction.”). I also note that the number of parallel

connections tended to be bursty and often exceeded 5-10 as users opened new browsing tabs while maintaining old tabs. In fact, 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.

34. Connections coming from a given user device would have been assigned to plural, and likely numerous, public-facing WiFi Access Point source ports. Any given port would have been typically assigned only seconds earlier and persist only for so long as needed to complete data transfer during a given connection. A given port would have been reassigned quickly, likely only a few seconds later, and with a high probability, a given port would have been assigned to a different device accessing Baig's content server. Given those realities, in my opinion, it would not have been feasible to "creat[e] an electronic database containing a multitude of associations... indicating an association between device identifiers" if "device identifiers" refers to IP address / port number combinations (as Dr. Lett's theory entails). There was no reason for a POSITA to generate an association between an IP address / port number combinations as device identifiers, particularly where there would be numerous port numbers being used by a single browser on a single device simultaneously, and therefore no motivation

to do so as the resulting combination would not be expected to function for the desired purpose.

35. The set of port numbers in a system such as Baig would change rapidly over time, as new connections are created and old connections are torn down, and over “legs” of the communication session. At a first moment, for example, a browser on a given device may use a specific set of port numbers as part of the browser-to-access-point communication session, but at the same moment the NAT layer of the Wi-Fi access point will use a *different* and unrelated set of port numbers as part of the access-point-to-Baig-server communication session. 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. 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. See Kozierok, C., TCP/IP Guide, http://www.tcpipguide.com/free/t_TCPIPApplicationAssignmentsandServerPortNumberRang-2.htm (ver. 3.0 Sept. 20, 2005) (Ex. 2006 at 1) (listing port number

ranges for “Well-known (Privileged) Port Numbers,”¹ “Registered (User) Port Numbers,” and “Private/Dynamic Port Numbers”). 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, and source ports will be constantly recycled for use among connections of different users and devices.

36. Because a POSITA considering Baig would have understood that a source port is ephemeral (i.e., capable of being reassigned to another connection at any given moment in time, including a connection originating from another user device), in my opinion a POSITA would have actively avoided attempting to reverse-engineer the constantly changing connection table ports of a Wi-Fi access point. This is especially the case given that the access point is not under control of Baig’s servers. Rosenberg et al., RFC 3261, “SIP: Session Initiation Protocol” (June 2002), *available at* <https://www.hjp.at/doc/rfc/rfc3261.html> (Ex. 2007) at

¹ The author says this category of port numbers is also known as “system port numbers” and says they are used by “server processes run by system administrators or privileged users.” A browser or set-top box accessing Baig’s content server would not meet those descriptions.

141 (“Note that, because the source port is often ephemeral...,² connections accepted by the transport layer will frequently not be reused.”).³ In other words, in my opinion, 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, but would instead proceed under the assumption that the

² In the context of a public WiFi access point such as that disclosed in Baig (and relied upon by Dr. Lett for his Ground D combination of references), a POSITA would understand that the source port assigned by the public WiFi access point would *always* be ephemeral because that is how intermediate NAT devices like WiFi access points with a variable and unpredictable number of users and connections would have operated.

³ The recommendation (*id.* at 142) “that connections be kept open for some implementation-defined duration after the last message was sent or received over that connection” simply means that, even 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.

source port number would change from moment to moment depending on the needs of the system performing the NAT translation (i.e., the Wi-Fi access point). Baig's reliance on user identification via session login (rather than inspecting the port number for device identification purposes) is designed with this limitation in mind.

37. In my opinion, a POSITA would have recognized that opening of multiple simultaneous connections would have been especially important for a browser accessing a relatively complex website such as Baig's, due to the relative complexity of Baig's website. Intermediate NAT systems at the time did (and still do) need to tear down ephemeral ports quickly, especially when their supported users access websites using higher complexity elements such as Javascript, HTML components, and multiple embedded graphics designed for parallel access or download. With the presence of such elements, browsers would open more and more parallel connections to obtain the requested website information as quickly as possible. By the 2006 to 2007 timeframe, such higher-complexity elements were common, and the website shown in Baig has exactly this type of complexity, given the interactive nature of the site and the numerous graphical elements being displayed. Machines that performed network address translation were particularly in need of quickly and efficiently recycling ephemeral ports because they would be providing source ports to numerous connections originating from numerous

devices. The limited number of ports and bursty nature of access in the Petition's proposed combination makes such recycling of ephemeral ports especially important.

38. In the context of the Baig system, where a Wi-Fi access point makes use of network address translation, ephemeral ports may have been recycled on the order of seconds (or even faster), and any external knowledge of those port numbers would become stale and incorrect very quickly. Thus, IP address/port number combinations would have been extremely unreliable for device-identification purposes. In my opinion, therefore, no POSITA would have considered using such a combination as a device identifier. In my opinion, a POSITA would have understood that no such identification would have been feasible due to numerous parallel connections and the rapid recycling of port numbers between connections and devices.

39. The facts and explanations discussed above support my opinions, including, in sum, the facts that (1) numerous IP address/port number combinations are applicable to connections originating from a given user device at any particular moment in time, (2) the port numbers applicable to active connections originating from a given device at a first moment in time will be reassigned to other connections at a second moment in time, including to connections originating from a different device, and (3) the port number assigned to the device-to-access-point

connection is not the same number as the port number assigned to the access-point-to-Baig-server connection, and a content server / VCSP such as disclosed in Baig would not be able to receive information about the WiFi access point's mapping of inbound and outbound port numbers (which mapping is ephemeral and changes rapidly, and the shielding of that mapping from public view is core to the operating principles of public access points such as those disclosed in Baig).

40. I understand the '015 patent as making clear that identifiers need not be "unique," as it gives examples of "unique identifiers" ("such as a complete MAC address or a complete device serial number") as well as examples of non-unique identifiers (such as "a partial MAC address or serial number, or a simple four-digit number"). Ex. 1001, 16:2-13. However, the specification teaches that such non-unique identifiers *still* make it "highly unlikely that a given IP address would be reallocated between STB's that happen to have the same identifier" and thus "can enable accurate directing of television ads to the correct STB" *Id.*, 16:4-13. Thus, in my opinion informed by the claim language of claim 1 of the '015 patent in view of its disclosure, an "identifier of a ... device" must serve a device-identification purpose, and a POSITA would not use information for device identification unless the information made it "highly []likely" to identify a particular device accurately such that it "can enable accurate directing of television ads to the correct" device. *Id.* at 16:4-13.

41. In the context of Baig, it would be clear to a POSITA that an IP address / port number combination identifies multiple devices on the same WiFi access point over a short period of time. Thus, an IP address / port number combination cannot reliably identify a device (and thus cannot be used as a device identifier). And even if the IP address / port number combination could somehow satisfy the “device identifier” limitation, a POSITA would have had no motivation to use that combination as a device identifier because it would have been exceptionally unreliable due to how quickly port numbers are reassigned by the WiFi access point.

42. In my opinion, even assuming use of NAT, there would have been no reason for a POSITA to *retain or store* associations between IP address/port number combinations in a database, in a system like Baig’s, as required by Element 1[B] of the ’015 patent.

43. Dr. Lett alleges that network address translation would have allowed the system “to uniquely identify, differentiate and properly route traffic between individual mobile devices that share a same IP address when communicating over the Internet.” Ex. 1002 ¶353. While IP address / port numbers combinations would have allowed for correct **routing** to different devices, however, they would not have allowed for any reasonable **identification** of those devices by remote servers or any device upstream from the NAT boundary for the reasons discussed above.

Instead, a POSITA would have recognized that because port numbers are assigned rapidly and would often be reassigned to other devices connecting to the same WiFi access point, a POSITA would have avoided using the IP address / port number combination as a device identifier in the manner Dr. Lett alleges.

44. I also disagree with Dr. Lett that “the proposed combination simply entails adapting Baig to use well-known and industry-standard NAT techniques, which were well-known and widely deployed by April 2007.” *See* Ex. 1002 ¶354. I agree that NAT techniques were well-known and widely deployed by April 2007. As an initial matter, I note that Dr. Lett does not identify any examples of any POSITAs (either before or after the priority date of the ’015 patent) using IP address / port number combinations as device identifiers that would be associated for cross-device content targeting as the claims require, and he does not cite to any documentary evidence suggesting that IP address / port number combinations would have been useful for such a purpose. Furthermore, I strongly disagree that the use of an IP address / port number combination for device identification purposes in the manner Dr. Lett proposes was well-known or industry standard. To the contrary, it would not have been a practical solution to do so by April 2007 (or any time after), and in my opinion a POSITA would have actively avoided implementing such a solution because it would have been extremely unreliable

insofar as identifying devices for cross-device content-targeting purposes as Dr. Lett proposes.