

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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FREEWHEEL MEDIA, INC.,

Petitioner

v.

ALMONDNET, INC.,

Patent Owner

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Case No.: IPR2024-00419

Patent No. 11,564,015

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Before JUSTIN T. ARBES, THOMAS L. GIANNETTI, and STACEY G. WHITE,  
*Administrative Patent Judges.*

**PETITIONER'S DEMONSTRATIVE EXHIBITS FOR ORAL ARGUMENT**

# Roadmap

- **Overview of the '015 Patent**
- Overview of the Prior Art
- Overview of the Proceedings
  - Not In Dispute
  - In Dispute
- Claim Interpretation
- Ground A – Baig-Banga507-Banga690-McFarland Renders the Claims Obvious
- Ground D – Baig-Zwicky-Damick Renders the Claims Obvious

# The '015 Patent

- The '015 Patent describes delivering targeted TV ads based on online behavior (Pet., Paper 2, p. 1; Inst. Dec., Paper 9, p. 4–6; Ex. 1001, '015 Patent, Abstract)
- Devices are associated with each other, via device IDs, based on sharing a common IP address (Pet., Paper 2, p. 1; Inst. Dec., Paper 9, p. 4–6; Ex. 1001, '015 Patent, 13:18–47)
- Associations between devices are used to deliver targeted ads based on the profile of the device user (Pet., Paper 2, p. 1; Inst. Dec., Paper 9, p. 4–6; Ex. 1001, '015 Patent, 13:18–47)

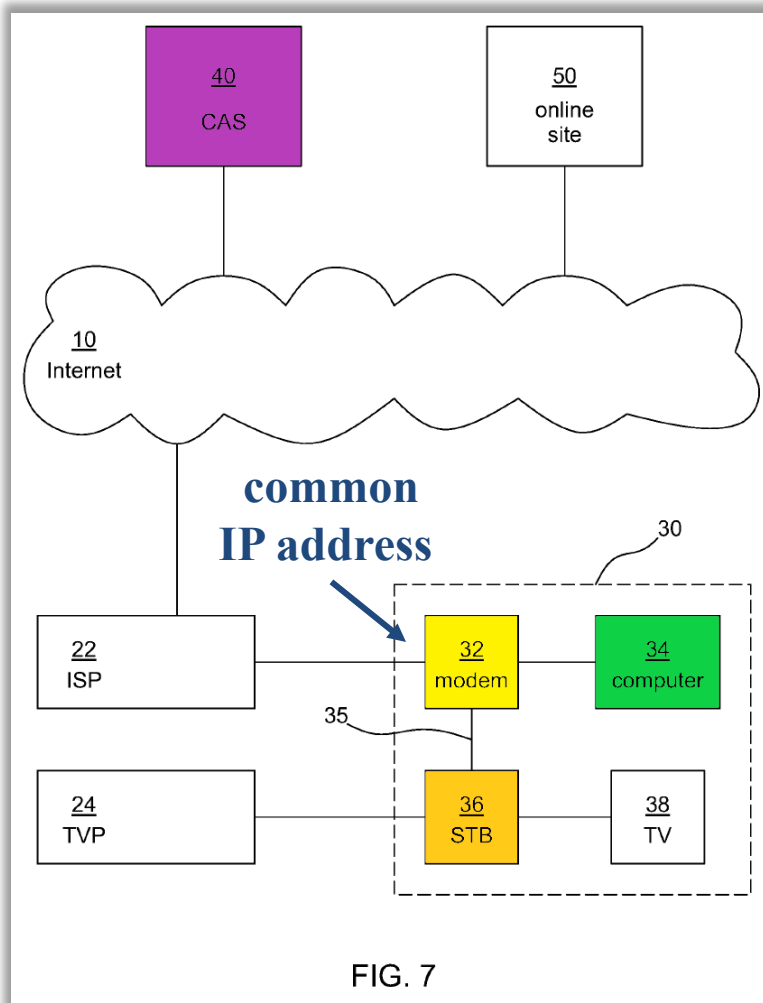
In a method for delivering targeted television advertisements based on online behavior, IP addresses indicating online access devices and IP addresses indicating television set-top boxes are electronically associated for a multitude of users. Using user profile information derived from online activity from one of the online access IP addresses, a television advertisement is selected, such as by using behavioral targeting or demographic information, and automatically directed to the set-top box indicated by the set-top IP address associated with that online access IP address. Preferably neither the user profile information nor the electronic association of online access and set-top box IP addresses includes personally identifiable information.

(Ex. 1001, the '015 Patent, Abstract)

appended claims. An online access IP address is assigned to modem 32 as described above. In cases where the user's STB 36 can also obtain online access via the same IP address as the user's online access (i.e., via modem 32), that common IP address comprises the electronic association that can be used to perform targeted television advertising without requiring PII. That case can occur by connecting STB 36 to the user's modem 32 via connection 35, in addition to connecting STB 36 to TVP 24. For example, STB 36 can be connected to a local area network (LAN) that shares device 32 for online access. In such an arrangement, network traffic is routed to a common IP address (i.e., the IP address of modem 32) for STB 36 and other devices connected to the LAN. The user can receive online access from any online

(Ex. 1001, the '015 Patent, 13:17–30)

# Figure 7 of '015 Patent



- The '015 Patent's system includes a **central ad server** (CAS), a **modem**, a **computer**, and a **set-top box** (STB)

(Pet., Paper 2, pp. 1–2; Inst. Dec., Paper 9, pp. 4–6; PO Resp., Paper 12, p. 3; Reply, Paper 17, pp. 3-4, 6-7  
Ex. 1001, '015 Patent, 9:35–60, 10:64–67, 13:8–13, FIG. 7)

- The **computer** and the **STB** access the Internet via the **modem** using a **common IP address**

(Pet., Paper 2, p. 2; Inst. Dec., Paper 9, p. 5–6;  
Ex. 1001, '015 Patent, 13:18–47)

(Ex. 1001, '015 Patent, FIG. 7, annotated; PO Resp., Paper 12, p. 3; Reply, Paper 17, pp. 3-4, 6-7)

# Proceedings: Instituted Grounds

Petitioner asserts that claims 1–26 are unpatentable based on the following grounds (Pet. 3):

## Ground A



PO Argues:

- 1) “Without using”  
Limitation Not  
Satisfied

| Claim(s) Challenged               | 35 U.S.C. §         | Reference(s)/Basis                            |
|-----------------------------------|---------------------|-----------------------------------------------|
| 1–7, 9, 10, 12–20, 22, 23, 25, 26 | 103(a) <sup>4</sup> | Baig, Banga507, Banga690, McFarland           |
| 8, 21                             | 103(a)              | Baig, Banga507, Banga690, McFarland, Costa    |
| 11, 24                            | 103(a)              | Baig, Banga507, Banga690, McFarland, Ashbaugh |

## Ground D



PO Argues:

- 1) No Motivation to Use  
IP:Port as claimed  
“device identifier”

| Claim(s) Challenged           | 35 U.S.C. § | Reference(s)/Basis               |
|-------------------------------|-------------|----------------------------------|
| 1–7, 9, 10, 13–20, 22, 23, 26 | 103(a)      | Baig, Zwicky, Damick             |
| 1–7, 9, 10, 13–20, 22, 23, 26 | 103(a)      | Baig, Satapati, Damick           |
| 8, 21                         | 103(a)      | Baig, Zwicky, Damick, Costa      |
| 8, 21                         | 103(a)      | Baig, Satapati, Damick, Costa    |
| 11, 24                        | 103(a)      | Baig, Zwicky, Damick, Ashbaugh   |
| 11, 24                        | 103(a)      | Baig, Satapati, Damick, Ashbaugh |
| 12, 25                        | 103(a)      | Baig, Zwicky, Damick, Banga507   |
| 12, 25                        | 103(a)      | Baig, Satapati, Damick, Banga507 |

(Inst. Dec., Paper 9, pp. 8–9 and 25;  
PO Resp., Paper 12, pp. 5–18)

# Independent Claim 1

|      |                                                                                                                                                                                                                                                                                                                                                                                                |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1A] | A computer system comprising at least one hardware server computer, wherein the computer system is programmed and connected to perform a method of <u>using common IP addresses to identify associations among multiple electronic devices</u> and using an identified association to cause cross-device action, the method comprising:                                                        |
| [1B] | (a) with the computer system, creating an electronic database containing a multitude of associations, each indicating <b>an association between device identifiers of two or more Internet-accessing electronic devices of a multitude of Internet-accessing electronic devices</b> , wherein:                                                                                                 |
| [1C] | (i) each of the associations is determined using stored data relating to Internet access by various of the multitude of devices, the stored data comprising (A) a device identifier of one of the Internet-accessing devices, (B) an IP address through which the one of the devices accessed the Internet, and (C) a timestamp identifying when the one of the devices accessed the Internet; |
| [1D] | (ii) at least some of the associations indicate association between at least two devices of the two or more Internet-accessing electronic devices, which association is determined by using the stored data to determine that both of the at least two devices have accessed the Internet via a common IP address at respective times satisfying a predetermined time-relation criterion;      |
| [1E] | (iii) at least some of the associations indicate association between at least two devices of the two or more Internet-accessing electronic devices, which association is determined without use of personally identifiable information; and                                                                                                                                                    |

- Parties dispute whether using IP:port combination as the claimed “device identifier” was obvious (Pet., Paper 2, pp. 50-53; PO Resp., Paper 12, pp. 9-18; Reply, Paper 17, pp. 7-23; Ex. 1001, '015 Patent, Claim 1)

# Independent Claim 1

|      |                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1F] | (iv) <b>the computer system</b> determining the associations <b>accesses the Internet without using any of the common IP addresses</b> of the associations identified in part (ii); and                                                                                                                                                                                                                     |
| [1G] | (b) when the computer system and a first device identified in a first association are in communication with one another, with the computer system using a device identifier of the first device and user profile information associated with a device identifier of a second device identified in the first association to cause an automatic action to be taken with respect to the first device, wherein: |
| [1H] | (i) the first association is one of the associations identified in part (a)(ii); and                                                                                                                                                                                                                                                                                                                        |
| [1I] | (ii) the first association was stored in the electronic database described in part (a) prior to the computer system and the first device being in communication with one another as described in part (b).                                                                                                                                                                                                  |

- Parties dispute proper interpretation of element [1F]’s “without using” limitation

(Pet., Paper 2, p. 25; Inst. Dec., Paper 9, pp. 20–21; PO Resp., Paper 12, pp. 5–9; Reply, Paper 17, pp. 2–6; Ex. 1001, '015 Patent, Claim 1 ([1F]))

## Patent Owner Acknowledges Claims Concern the Embodiments in Figures 7–12 of '015 Patent

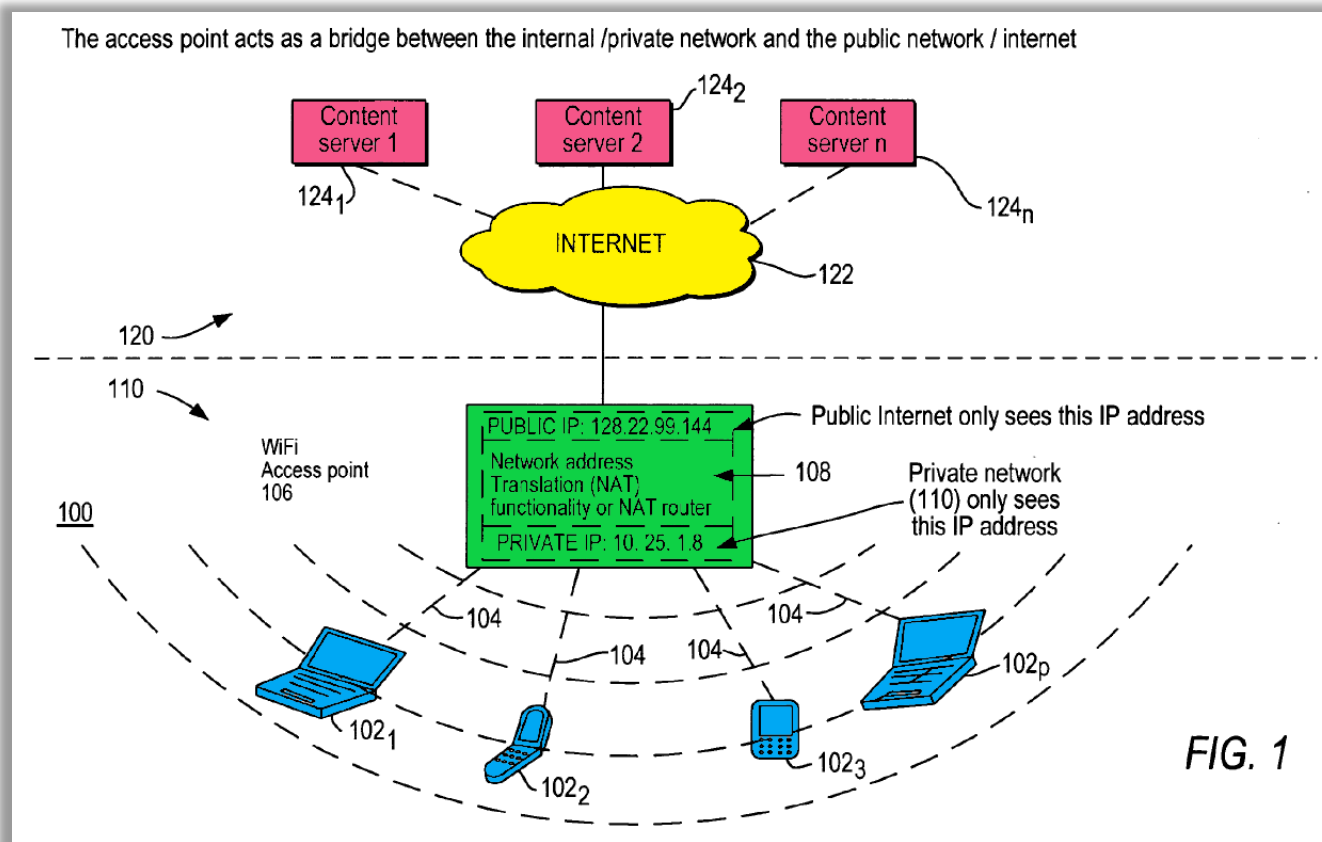
The '015 patent's specification discloses two primary types of systems, a first in which a “common service provider that acts as both an internet service provider and a television provider” (ISP/TVP) provides data to associate devices (Ex. 1001 at 9:31-13:3 and Figs. 1-6), and a second in which “the user need not receive both television service and Internet access from a common service provider” and the devices are associated instead via common IP address (*id.* 13:4 et seq. and Figs. 7-12). The claims of this continuation patent concern the “common IP address” embodiments, and the type of device (e.g., STB) is introduced only in dependent claims.

(PO Resp., Paper 12, p. 3)

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# Prior Art: Baig (Grounds A & D)

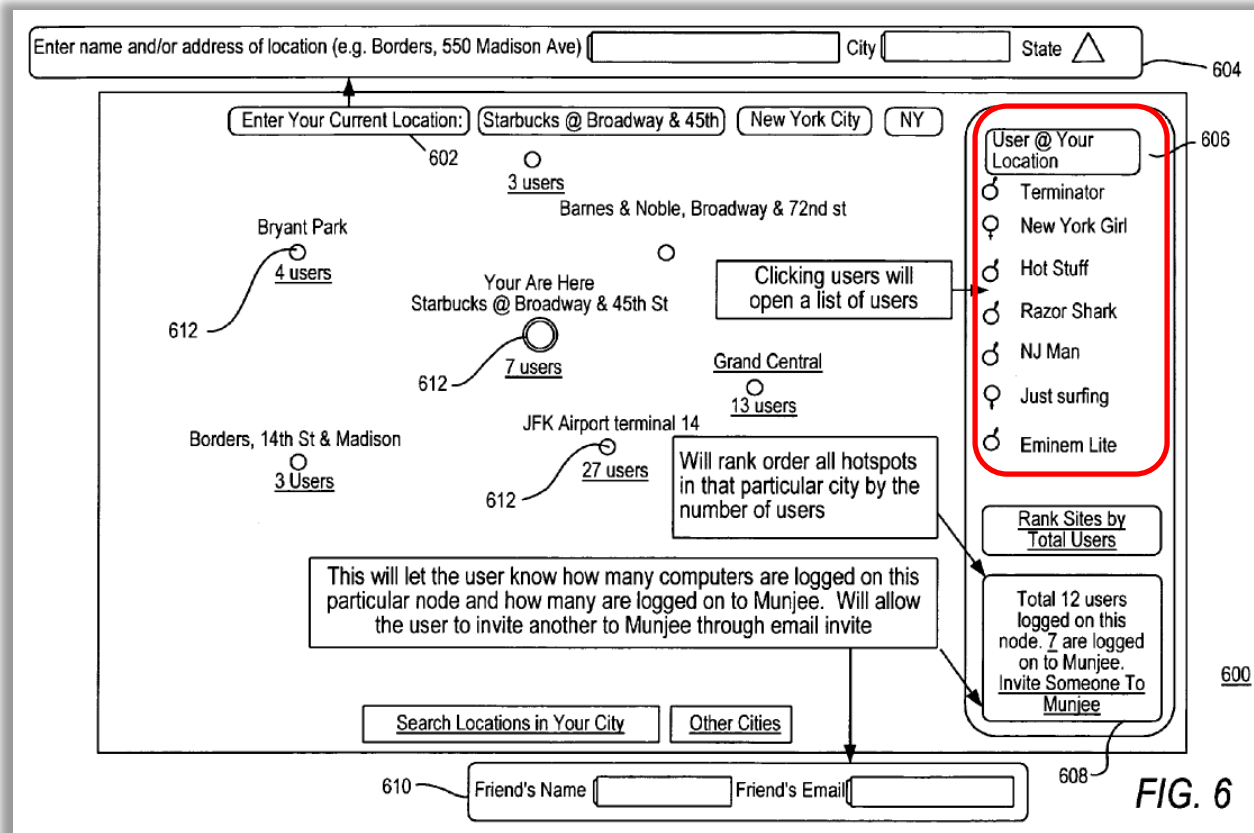


(Ex. 1007, Baig, Fig. 1, annotated)

- Baig's **devices** connect to the **Internet** via an **access point** to access web pages of a vicinity-based service provider (VCSP) hosted at **content servers**

(Pet., Paper 2, pp. 3–4; Inst. Dec., Paper 9, pp. 11–13; Ex. 1007, Baig, ¶¶ 4, 42–46, 49–53, 55–60, 63–64, 74, FIGS. 1–3)

# Prior Art: Baig (Grounds A & D)



(Ex. 1007, Baig, Fig. 6, annotated)

- Baig's VCSP groups **users** in the same vicinity that are connected to the same AP, which provides Internet access to the users' devices using a common IP address

(Pet., Paper 2, pp. 4–5; Inst. Dec., Paper 9, pp. 11–13; Ex. 1007, Baig, ¶¶ 6, 37–38, 44–46, 49–52, 56, 59, 63, 75–76, 94, FIG. 6)

# Prior Art: Baig (Grounds A & D)

- Like the '015 Patent, Baig's VCSP website sends targeted advertisements to devices connected via a common IP address based on online user profiles

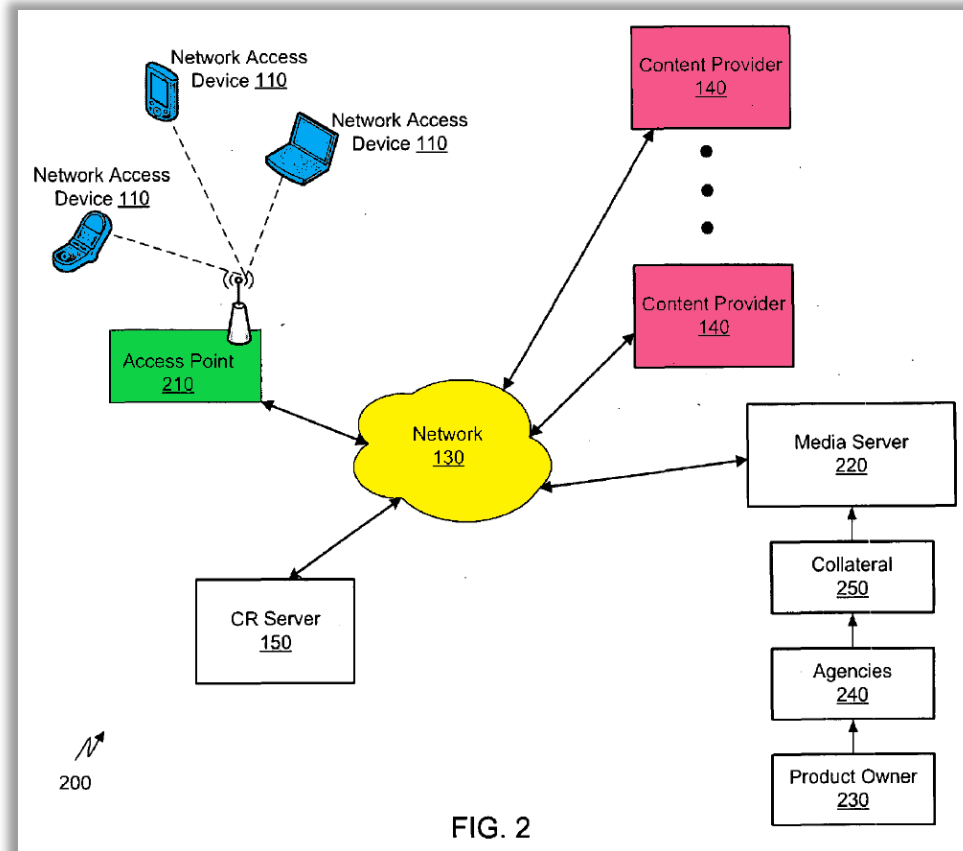
[0011] In another embodiment, the vicinity-based community services comprise an advertising service. One or more advertising entities can bid to provide advertising to the end users at a given wireless hotspot based upon the user traffic patterns at that hotspot (e.g. number of users at a peak usage hour at a hot spot) or other end-user profiling characteristics such as age, gender etc.

[0054] Accordingly, the present invention includes an online service that facilitates a website which enables users at a WiFi hotspot to discover other users connected to the same hotspot, thus forming a vicinity-based community. Once the users log into the website of the online service provider 202, the users can engage in various activities with other users in their vicinity (i.e., physical location), such as providing bartering services for goods and services among wireless users in a vicinity; providing vicinity-based targeted advertising; creating a bidding system for advertisers; enabling WiFi users in the vicinity to play video games with one-another, providing chat rooms, among other activities and services. Thus, the present invention enables the creation of location-based and vicinity-based communities.

[0061] The vicinity-based user network (i.e., the mesh-network of vicinity-based hotspots 110) increases the VCSP services that are available to the users at the hotspots. For example, the location based barter service provides the users with the ability to barter products in their local vicinity-based hotspot community, as well as with users in the entire vicinity based online community (i.e., mesh network). Similarly, vicinity-based advertising provides the ability to advertise to an audience at a particular WiFi hotspot based upon the profile (e.g., age or gender) of the user (among other profile information), as well as advertise to other vicinity-based hotspots in the mesh network of the VCSP 202.

(Pet., Paper 2, pp. 11–12; Inst. Dec., Paper 9, pp. 11–13; Ex. 1007, Baig, ¶¶ 11–12, 54, 58–59, 61–62, 93–95, 98–106, 114–117, 120)

# Prior Art: Banga507 (Ground A)

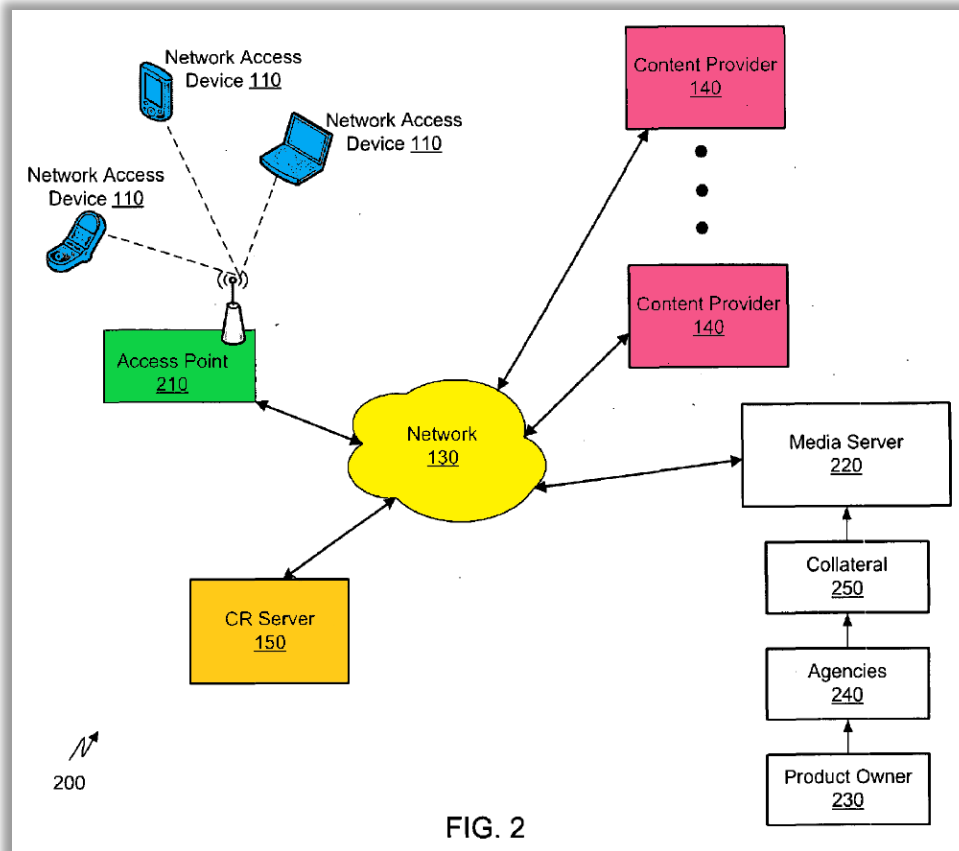


(Ex. 1015, Banga507, Fig. 2, annotated)

- Banga507's **devices** access **content providers** over the **Internet** via a shared **access point**

(Pet., Paper 2, pp. 10–11; Inst. Dec., Paper 9, p. 15; Ex. 1015, Banga507, ¶¶ 22–23, 26–27, 33–34, FIGS. 1–2)

# Prior Art: Banga507 (Ground A)



(Ex. 1015, Banga507,  
Fig. 2, annotated)

- Banga507's **access point** reports **Internet** access information (device ID, date/time, AP's IP address) to a **customer relationship (CR) server**

(Pet., Paper 2, pp. 10–11; Inst. Dec., Paper 9, p. 15; Ex. 1015, Banga507, ¶¶ 22–23, 26–29, 33–34, 37, 47, 54, FIGS. 1–2)

# Prior Art: Banga507 (Ground A)

- Banga507 sends targeted advertisements based on user preferences, network access histories, and network access patterns

(Pet., Paper 2, pp. 11–12; Inst. Dec., Paper 9, p. 15; Ex. 1015, Banga507, ¶¶ 12–13, 38, 45, 60, 68–70, 78–79)

[0012] In further embodiments, the media selection optimizer utilizes access point information, historic information, and/or access point location-centric information along with the user profile information to determine the directed media component. The access point information is retrieved from an access point through which the network access device is accessing the network. The historic information is based on past interactions which form patterns of usage for the network access device. In some embodiments, the historic information may be incorporated into the user profile. The location-centric information is obtained from any source with knowledge of events, conditions, and other attributes of the location in which the access point is located.

(Ex. 1015, Banga507, ¶12)

[0038] In exemplary embodiments, when the user visits a web site of a content provider 140, the user will see directed media on portions of a web page. In some embodiments, the directed media is targeted advertisement. Alternatively, the directed media may comprise targeted audio, video, coupons, or other media tailored to the interests/preferences of the user. The directed media is typically located on particular portions of the content provider's web page (e.g., in a banner ad location).

(Ex. 1015, Banga507, ¶38)

# Prior Art: Banga507 (Ground A)

[0042] The profile engine 310 can further customize the user profile based on individual characteristics, preferences, and habits of the user of a particular network access device 110. For example, if the user repeatedly accesses the network 130 with the same network access device 110 through an access point 210 at a particular coffee shop, the user profile associated with the device identifier may indicate that the user has a preference for the coffee shop. As a result, the user profile may indicate that the user prefers coffee or a particular coffee shop.

(Ex. 1015, Banga507, ¶42)

[0045] In another embodiment, predetermined group identifier may be generated and utilized by the profile engine 310. For example a soft drink company may wish to direct advertisements to a certain demographics. A group identifier can be generated that corresponds to that demographic and user profiles that fall into the demographics will include this group identifier. The generation of the user profile is described in detail in U.S. application Ser. No. \_\_\_\_\_, entitled “Developing Customer Relationships with a Network Access Point,” which is incorporated by reference.

(Ex. 1015, Banga507, ¶45)

- Banga507 creates user group profiles and sends targeted advertisements to the user groups

(Pet., Paper 2, p. 12; Inst. Dec., Paper 9, p. 15; Ex. 1015, Banga507, ¶¶ 11–13, 21–22, 30, 38, 41–45, 47, 49, 59, 61, 67–72, 74, 76–79)

via the information collection engine 320. Using the retrieved information, the media selection optimizer 340 performs an analysis to match up the user profile information, user preferences, and group identifiers with access point and location-centric information to determine the most appropriate media or media type that should be directed to the network access device 110 requesting the content from the content provider 140. In some embodiments, a media tag identifying the media or media type is forwarded to the media server 220 or the content provider 140. In alternative embodiments, the actual media may be forwarded to the media server 220 of content provider 140.

(Ex. 1015, Banga507, ¶38)

# Prior Art: Banga690 (Ground A)

- Banga690 teaches that profiles can include the access point's IP address and multiple device IDs

(Pet., Paper 2, p. 12; Inst. Dec., Paper 9, p. 15; Ex. 1016, Banga690, ¶ 46)

[0046] The profile engine 310 is configured to retrieve one or more device records and generate user profiles. The user profile may comprise one or more device identifiers, current IP address associated with device identifiers, access information, device histories, or any other information associated with the network access devices 110 (FIG. 2) or device identifiers.

(Ex. 1016, Banga690, ¶ 46)

# Prior Art: McFarland (Ground A)

- McFarland teaches providing recommendations to group members based on preferences of other group members

(Pet., Paper 2, p. 12; Inst. Dec., Paper 9, pp. 15–16; Ex. 1018, McFarland, Abstract, 3:53–64, 4:15–19)

(57)

## ABSTRACT

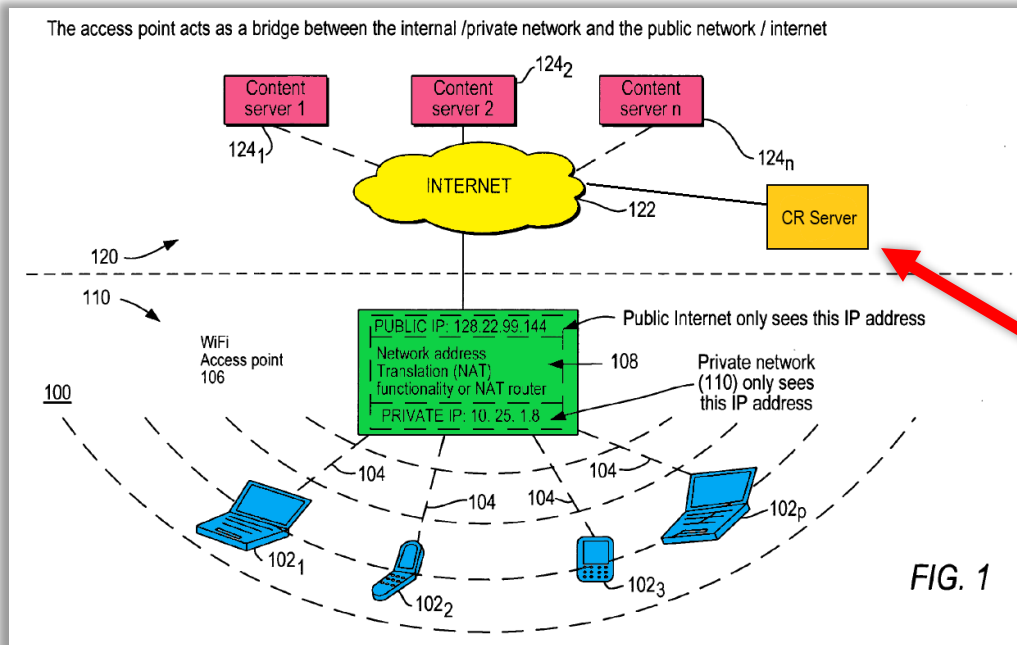
Computer services use group preferences, as partially or wholly specified by preference lists of individual members, to identify items well suited for a designated group of users. In one embodiment, items in the movie/video rental queue (one type of preference list) of a first user are prioritized based, at least partly, on the rental queue of a second, affiliated user, to give priority to items corresponding to the collective preferences of both users. Items may also be recommended to the users based on their collective preferences. In a second embodiment, the suggestion lists of multiple members of a book club are used, optionally in combination with other member preference information, to select or recommend book titles for the club. In a third embodiment, the wish lists of two or more affiliated users are used to assist others in purchasing gifts that correspond to their collective preferences.

(Ex. 1018, McFarland, Abstract)

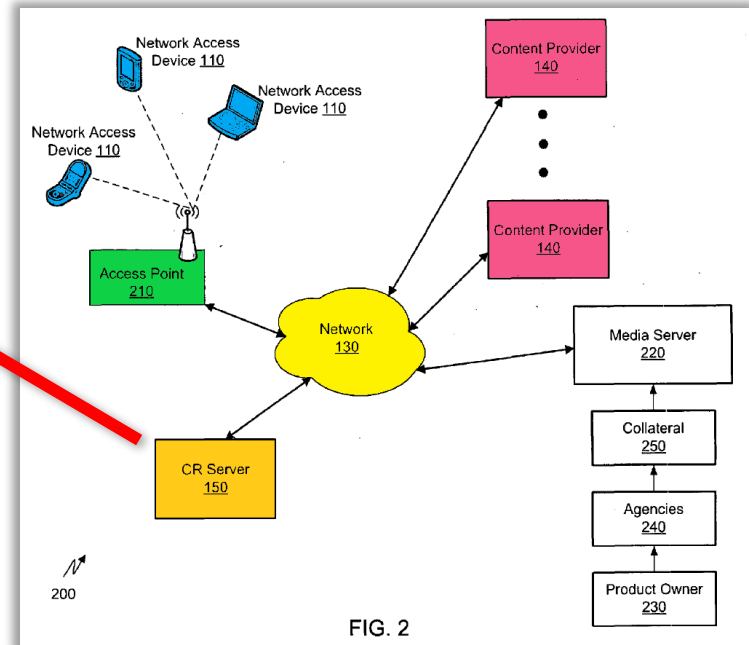
Four particular embodiments of the invention are described below. The first embodiment involves movie/video rental queues, the second involves suggestion lists created by members of a book club, the third involves wish lists, and the fourth involves a “movie night” feature. As will be apparent, the various features of the invention can also be used with other types of preference lists, such as shopping lists used to make initial or recurring purchases of items, and can be used with other types of items.

(Ex. 1018, McFarland, 4:15–19)

# Combination: Baig-Banga507-Banga690-McFarland (Ground A)



(Ex. 1007, Baig, FIG. 1, annotated and modified)



(Ex. 1015, Banga507, FIG. 2, annotated)

- Add to Baig's system a **CR server** like Banga's and the reporting functionality of Banga's **access point**

(Pet., Paper 2, pp. 12–15; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 142-148; Inst. Dec., Paper 9, p. 16; Ex. 1007, Baig, FIG. 1; Ex. 1015, Banga507, FIG. 2)

# Combination: Baig-Banga507-Banga690-McFarland (Ground A)

- Use **CR server** to create group profiles for users that access the **access point** at the same time each week (e.g., coffee shop AP every Sunday at 10am)

(Pet., Paper 2, pp. 12–14; Ex. 1002, Lett 1st Dec., ¶¶ 145-146, 149; Inst. Dec., Paper 9, p. 16; Ex. 1007, Baig, ¶ 39; Ex. 1015, Banga507, ¶ 54)

[0039] For example, end-users connected to a hotspot provided by a coffee shop (e.g., STARBUCKS), illustratively located at 100 Madison Avenue, NY, N.Y., are asked to provide the street address of the STARBUCKS where the WiFi hotspot is located. End users are also asked other optional data such as age and gender etc. of each user. As the public IP addresses of each hotspot are unique, the VCSP is able to build a database that associates the unique public IP addresses of each hotspot with the street address of a physical location (e.g. “280 Park Ave, NY, N.Y.” or “Starbucks at 48th and Park, NY, N.Y.”).

(Ex. 1007, Baig, ¶ 39)

[0054] The history module 430 is configured to collect and maintain historic information regarding a network access device 110. For example, every time a same device identifier is received by the CR server 150, a number of times the network 130 is accessed, the corresponding access point 210 used, date and time of access, and so forth may be tracked by the history module 430. Historical information is then used to establish a pattern for which aspects of the user profile may be developed from. For example, if a user has a history of accessing the network 130 from a particular location at a particular day and time (e.g., corner coffee shop at 10 am every Sunday), the history module 430 will record this pattern. The pattern may then be used to assign group identifiers.

(Ex. 1015, Banga507, ¶ 54)

# Combination: Baig-Banga507-Banga690-McFarland (Ground A)

- Similar to the '015 Patent, targeted advertisements are sent to group members that connect to the Internet using a common IP address based on online profiles and preferences of other group members having similar network access habits

(57)

## ABSTRACT

Computer services use group preferences, as partially or wholly specified by preference lists of individual members, to identify items well suited for a designated group of users. In one embodiment, items in the movie/video rental queue (one type of preference list) of a first user are prioritized based, at least partly, on the rental queue of a second, affiliated user, to give priority to items corresponding to the collective preferences of both users. Items may also be recommended to the users based on their collective preferences. In a second embodiment, the suggestion lists of multiple members of a book club are used, optionally in combination with other member preference information, to select or recommend book titles for the club. In a third embodiment, the wish lists of two or more affiliated users are used to assist others in purchasing gifts that correspond to their collective preferences.

(Ex. 1018, McFarland, Abstract)

(Pet., Paper 2, p. 14–15; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 145, 149–150; Inst. Dec., Paper 9, p. 16; Ex. 1018, McFarland, Abstract, 3:53–64, 4:15–19)

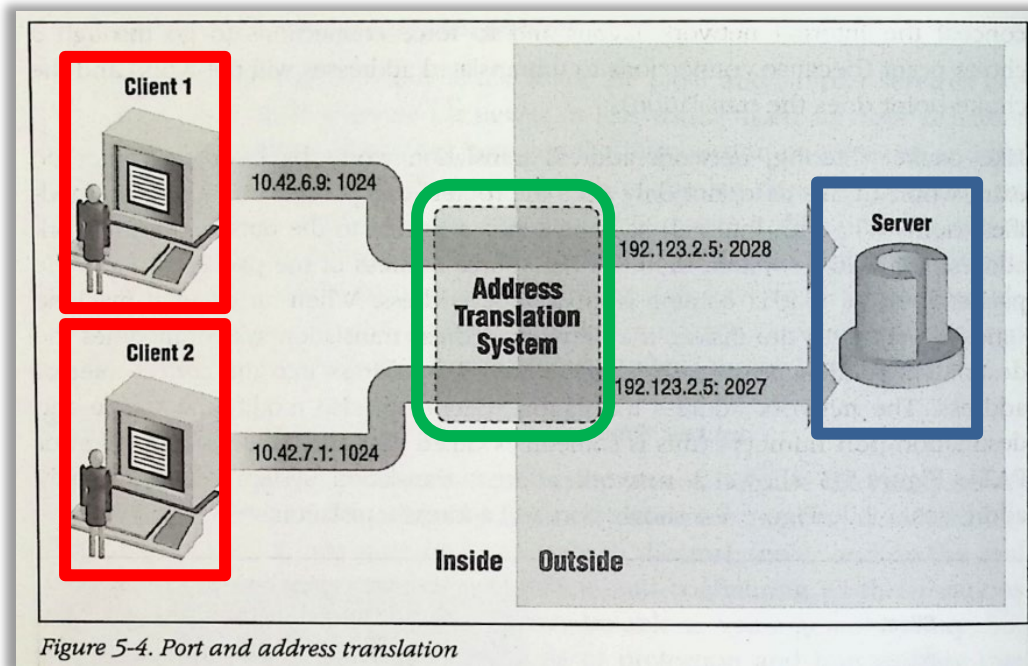
Four particular embodiments of the invention are described below. The first embodiment involves movie/video rental queues, the second involves suggestion lists created by members of a book club, the third involves wish lists, and the fourth involves a “movie night” feature. As will be apparent, the various features of the invention can also be used with other types of preference lists, such as shopping lists used to make initial or recurring purchases of items, and can be used with other types of items.

(Ex. 1018, McFarland, 4:15–19)

# Prior Art: Zwicky (Ground D)

- Zwicky teaches techniques for **network address translation** (NAT) and **port address translation** (PAT) between **clients** and a **server**

(Pet., Paper 2, pp. 46–48; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 343–344; Inst. Dec., Paper 9, p. 13–14; Ex. 1012, Zwicky, pp. 33–35, FIG. 5-4)

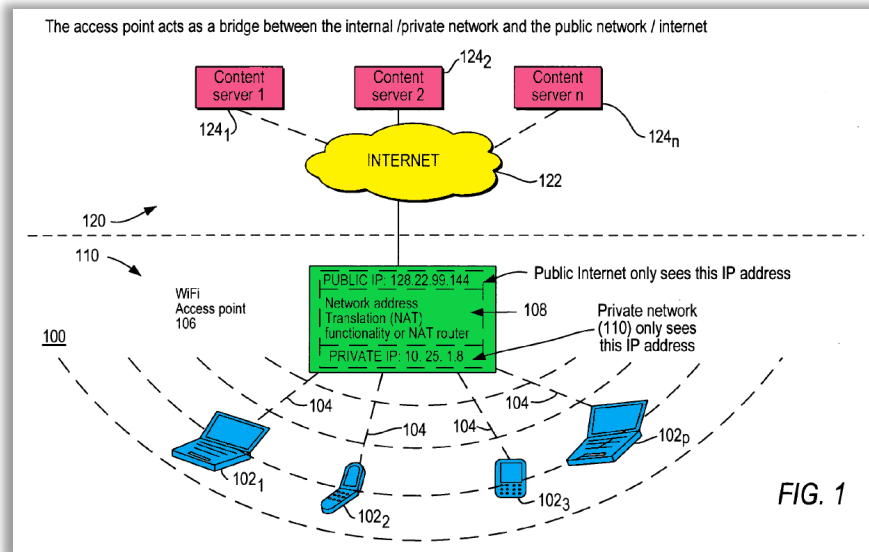


Client 1 IP:port  
translated from  
10.42.6.9:1024 to  
192.123.2.5:2028

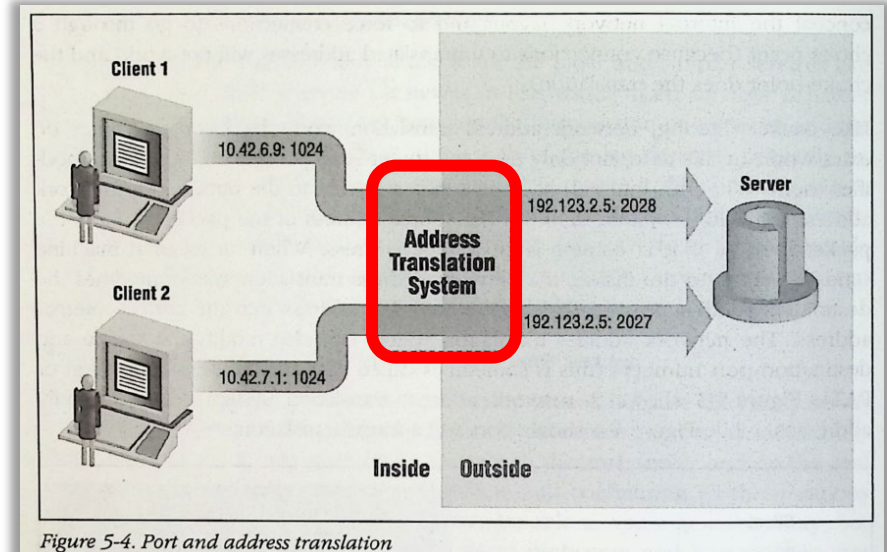
Client 2 IP:port  
translated from  
10.42.7.1:1024 to  
192.123.2.5:2027

(Ex. 1012, Zwicky, p. 35, FIG. 5-4)

## Combination: Baig-Zwicky-Damick (Ground D)



(Ex. 1007, Baig, FIG. 1, annotated)

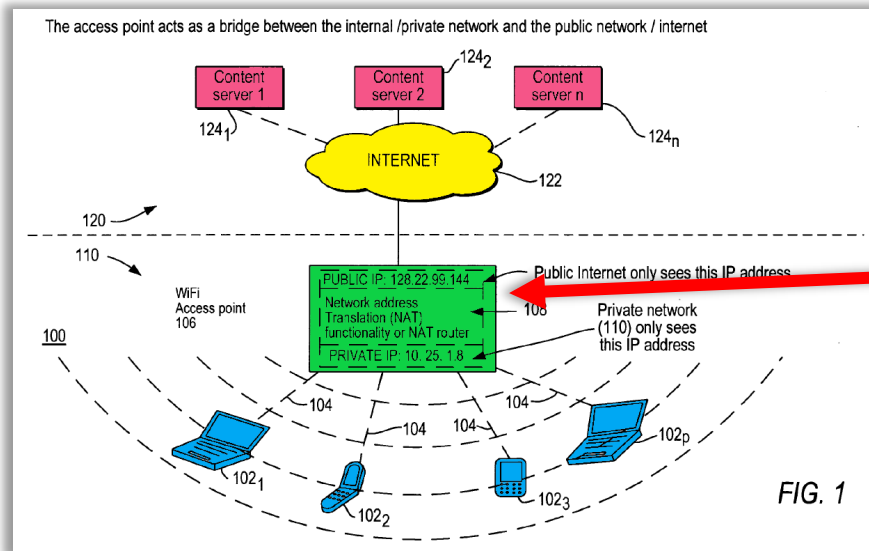


(Ex. 1012, Zwicky, p. 35, FIG. 5-4, annotated)

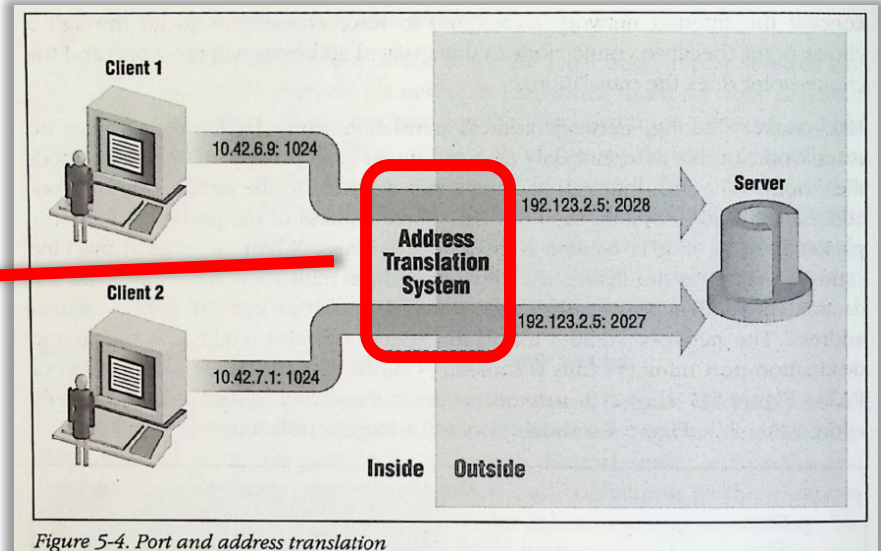
- **Baig** relied on for its teachings of a vicinity-based service provider (VCSP) that grouped user devices connected to the Internet from the same **access point** (AP) using a **common IP address**
- **Zwicky** relied on for its teachings of **port address translation**, whereby a device is uniquely identified by its IP address and associated port number

(Pet., Paper 2, pp. 43–48; Ex. 1002, Lett 1st Dec., ¶¶ 335, 342–346; Ex. 1007, Baig, ¶¶ 2, 38, 42–44, 49–54, 59, 63; Ex. 1012, Zwicky, pp. 33–35)

# Combination: Baig-Zwicky-Damick (Ground D)



(Ex. 1007, Baig, FIG. 1)



(Ex. 1012, Zwicky, p. 35, FIG. 5-4)

- Obvious to implement **port address translation** as taught by Zwicky (and as generally known) at Baig's **access point** in order to allow Baig's devices to use a **common IP address** for Internet access but still be uniquely identified

(Pet., Paper 2, pp. 46–49; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 349, 351; Ex. 1007, Baig, ¶¶ 43–46, 49–51; Ex. 1012, Zwicky, pp. 33–35)

# Prior Art: Damick (Ground D)

- Damick relied on for its teachings directed to logging the time of Internet access and controlling Internet access for specified time periods in order to show claimed “time-relation criterion” (undisputed by Patent Owner)

[0062] Included in the access control options are various options that determine when, or how long, Internet access may be granted to a user of client 104. The options include (i) an option 555 to block all Internet access, which never allows an access request, (ii) an option 560 to allow Internet access by time of day which may grant an access request during predetermined times of specified days, (iii) an option 570 to allow Internet access on particular days only (Saturday and Sunday are shown in FIG. 5B), (iv) an option 575 to allow Internet access for a specified amount of time each day (1 hour is shown in FIG. 5B), (v) an option 580 to allow homework time, which may grant access requests from 4 pm-8 pm to allow use of the Internet for homework, or may block access requests from 4 pm-8 pm so that a user will not be distracted from homework, (vi) an option 585 to allow unlimited access every day, and (vii) an option 590 to allow custom settings, which may grant access requests according to a combination of the above access control options and/or access control options other than those previously mentioned.

(Ex. 1017, Damick, ¶ 62)

(Pet., Paper 2, p. 55–59; Ex. 1017, Damick, ¶¶ 39–43, 60–64, 69, 72–73, 75–84)

[0069] Referring to FIG. 6b, a portion 620 of the log report of access requests is illustrated that shows sites visited by Kid’s PC 538. The portion 620 is displayed in response to an user selecting option 612 to view the sites visited by Kid’s PC 538. The portion 620 includes a client log 625. The client log 625 includes a number of visits, such as, for example, an entry 630 showing one visit to www.aolkid-s.com at 9:12 pm. Each entry (e.g., entry 630) includes a frequency 635 showing the number of times a client 104 has accessed a particular URL, a time 635 showing the time of day at which the client 104 accessed the particular URL, and a location 640 showing a URL for the web address of the network location accessed by the client 104.

(Ex. 1017, Damick, ¶ 69)

# Combination: Baig-Zwicky-Damick (Ground D)

- Obvious to implement port address translation techniques as taught by Zwicky as part of NAT performed in Baig's system to allow multiple devices using a single IP address to be uniquely identified based on port numbers

(Pet., Paper 2, p. 46–51; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 349-355; Ex. 1012, Zwicky, pp. 33-35)

- Obvious to implement network access controls as taught by Damick in Baig's system in order to provide enhanced control over users' access to the Internet and Baig's VCSP services

(Pet., Paper 2, pp. 55–59; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 384-390, 393; Ex. 1017, Damick, ¶¶ 2, 39–43, 60–64, 69–87)

# Roadmap

- Overview of the '015 Patent
- Overview of the Prior Art
- **Overview of the Proceedings**
  - Not In Dispute
  - In Dispute
- Claim Interpretation
- Ground A – Baig-Banga507-Banga690-McFarland Renders the Claims Obvious
- Ground D – Baig-Zwicky-Damick Renders the Claims Obvious

# Proceedings: Not in Dispute

- Patent Owner does not separately challenge any of Grounds B–C and Grounds E–K  
(PO Resp., Paper 12, p. 18; Reply, Paper 17, pp. 23–24)
- The Baig-Banga507-Banga690-McFarland (*Ground A*) combination renders obvious elements [1B]-[1E] and [1G] of independent claim 1  
(PO Resp., Paper 12, pp. 5–9 (Ground A))
- The Baig-Zwicky-Damick combination (*Ground D*) contains all elements of independent claim 1 and renders it obvious if there is a motivation to combine  
(PO Resp., Paper 12, pp. 9–18 (Ground D))

# Proceedings: In Dispute

- Whether the Baig-Banga507-Banga690-McFarland combination (Ground A) satisfies the “without using” limitation ([1F]) as properly understood

(Pet., Paper 2, p. 25; Inst. Dec. Paper 9, pp. 20–21; PO Resp., Paper 12, pp. 5–9; Reply, Paper 17, pp. 2–6 (§II.A) and 6–7 (§II.B); Ex. 1001, Claim 1 ([1F]))

- Whether the Baig-Zwicky-Damick combination (Ground D) provides a motivation sufficient to support the conclusion of obviousness

(Pet., Paper 2, pp. 45–54; PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 7–21; Ex. 1001, '015 Patent, Claim 1 ([1F])

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## Patent Owner Implicitly Asserts an Erroneous Interpretation of the Claimed “computer system” ([1A]) and the “without using” Limitation ([1F])

- The Board preliminarily found, and the Patent Owner acknowledged, that no terms require express construction

(Pet., Paper 2, p. 9; Inst. Dec., Paper 9, p. 9; PO Resp., Paper 12, p. 5; Reply, Paper 17, pp. 2 and 7)

Petitioner asserts that “[n]o express construction is necessary at this time.” Pet. 7 (citing Lett Decl. ¶ 133). At this stage, Patent Owner does not offer any response on claim construction. As demonstrated in the analysis

(Inst. Dec. , Paper 9, p. 9)

- Yet, Patent Owner argues the “without using” limitation cannot be met by a system where one portion of the system accesses the Internet without using one of the claimed “common IP addresses” but a different portion of the system accesses the Internet using a common IP address

(PO Resp., Paper 12, pp. 5–9; Reply, Paper 17, pp. 2–7)

# Patent Owner Implicit Interpretation of the “without using” Limitation is Unnecessarily Narrow

[1F]

(iv) the computer system determining the associations **accesses the Internet without using any of the common IP addresses** of the associations identified in part (ii); and

- Patent Owner argues the “without using” limitation cannot be met by a system where one portion of the system accesses the Internet without using one of the claimed “common IP addresses” but a different portion of the system accesses the Internet using a common IP address  
(PO Resp., Paper 12, pp. 5–9; Reply, Paper 17, pp. 2–7)
- Patent Owner’s argument unnecessarily excludes from the claimed “computer system” any device that, at any time, accesses the Internet using one of the claimed “common IP addresses”  
(PO Resp., Paper 12, pp. 5–9; Reply, Paper 17, pp. 1–7)

## Patent Owner Cites to Nothing to Support its Implicit Interpretation

- Patent Owner does not support its narrow interpretation of the “without using” limitation with any citation to either the claims of the '015 Patent, its detailed description, or its figures

(PO Resp., Paper 12, pp. 8–9; Reply, Paper 17, p. 3)

- Patent Owner relies on only attorney argument to support its narrow interpretation

(PO Resp., Paper 12, pp. 8–9; Reply, Paper 17, p. 3)

Fatally to the Petition’s Ground A theory, a system that accesses the Internet using an IP address *additional to* the claimed common IP addresses (which is what the Petition alleges) is not the same as a system that accesses the Internet *without* using the claimed common IP addresses. Indeed, the Petition acknowledges that the

(PO Resp., Paper 12, p. 8)

## The Intrinsic Evidence Does Not Support Patent Owner's Improperly-Narrowed Interpretation

- The '015 Patent includes no discussion of the “without using” limitation  
(Reply, Paper 17, pp. 3–4)
- Patent Owner's interpretation excludes embodiments in the specification (that the claims are directed to) by attempting to draw a distinction between:

a system that accesses the Internet using an IP address in addition to one of the “common IP addresses”

a system that never uses one of the “common IP addresses” to access the Internet

(Reply, Paper 17, p. 3)

- Nothing in the '015 Patent limits “without using” to “never using”  
(Reply, Paper 17, p. 3)

## Patent Owner's Interpretation Excludes the '015 Patent's Own Embodiments

- Patent Owner asserts that the '015 Patent's claims are directed to the embodiments shown in Figures 7–12
- The '015 Patent explains that every figure “illustrate[s] schematically a system for targeting television advertisements”

(PO Resp., Paper 12, p. 3; Reply, Paper 17, p. 4, fn.2)

(Ex. 1001, '015 Patent, 8:38–48; Pet., Paper 2, pp. 1-2; Reply, Paper 17, pp. 3-4)

The '015 patent's specification discloses two primary types of systems, a first in which a “common service provider that acts as both an internet service provider and a television provider” (ISP/TVP) provides data to associate devices (Ex. 1001 at 9:31-13:3 and Figs. 1-6), and a second in which “the user need not receive both television service and Internet access from a common service provider” and the devices are associated instead via common IP address (*id.* 13:4 et seq. and Figs. 7-12). The claims of this continuation patent concern the “common IP address” embodiments, and the type of device (e.g., STB) is introduced only in dependent claims.

(PO Resp., Paper 12, p. 3)

FIGS. 1-5 and 6A-6C illustrate schematically a system for targeting television advertisements based on online behavior in which online access and television service are provided by a common provider.

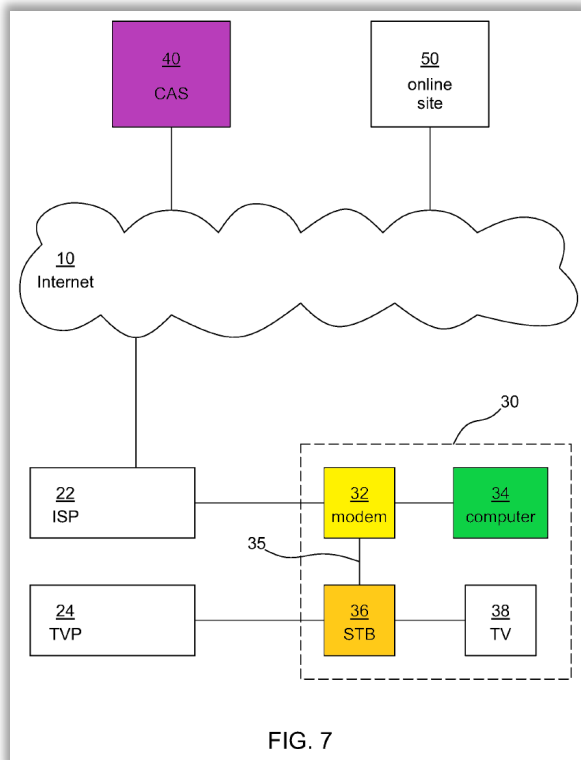
FIGS. 7-10, 11A-11C, and 12 illustrate schematically a system for targeting television advertisements based on online behavior in which online access and television service are provided by different providers.

FIGS. 13 and 14 illustrate schematically a system for targeting television advertisements based on online behavior in which online access is provided by a mobile device.

The embodiments shown in the figures are exemplary and should not be construed as limiting the scope of the present disclosure and/or appended claims.

(Ex. 1001, '015 Patent, 8:38–48)

## The System in the '015 Patent's Figure 7 Includes the Devices that Access the Internet Using the Common IP Address



(Ex. 1001, '015 Patent, FIG. 7, annotated;  
Reply, Paper 17, pp. 3-4)

FIGS. 7-10, 11A-11C, and 12 illustrate schematically a system for targeting television advertisements based on online behavior in which online access and television service are provided by different providers.

(Ex. 1001, '015 Patent, 8:42-45; Pet., Paper 2, pp. 1-2)

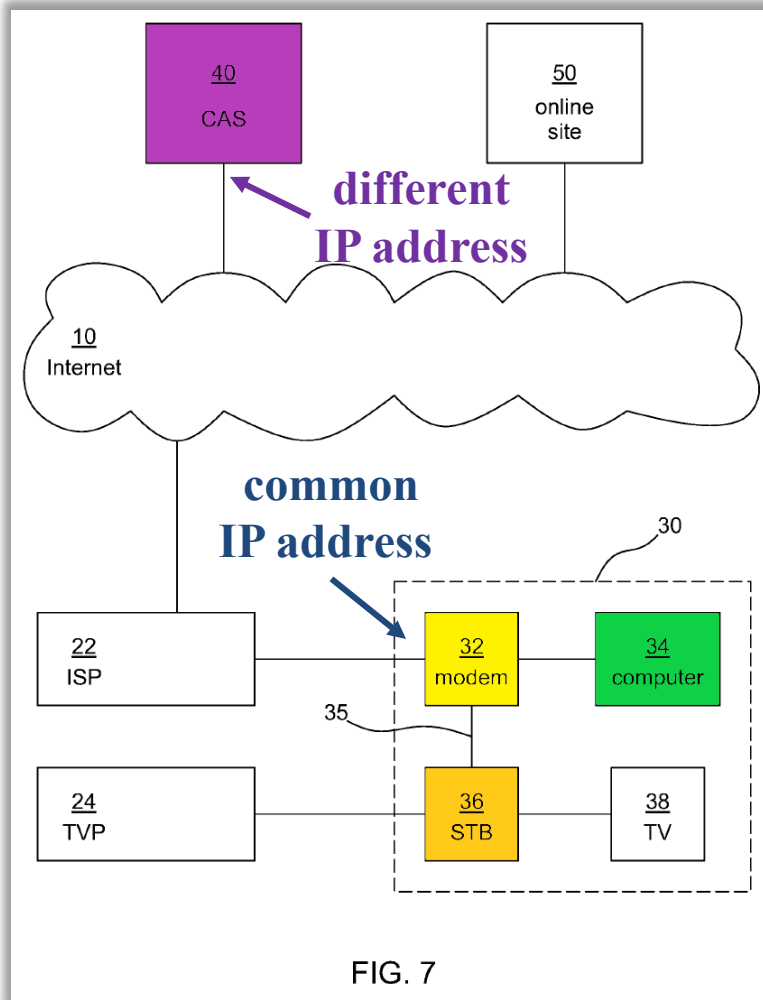
In another exemplary system for serving targeted television advertisements based on a user's online behavior, the user need not receive both television service and Internet access from a common service provider. The basic layout for such a system is illustrated schematically in FIG. 7, with modem 32 connected to Internet service provider (ISP) 22 for providing online access, and STB 36 connected to television provider (TVP) 24 for providing television service. Again, modem 32 and computer 34 are described as

(Ex. 1001, '015 Patent, 13:5-13; Pet., Paper 2, pp. 1-2; Reply, Paper 17, pp. 4-5)

appended claims. An online access IP address is assigned to modem 32 as described above. In cases where the user's STB 36 can also obtain online access via the same IP address as the user's online access (i.e., via modem 32), that common IP address comprises the electronic association that can be used to perform targeted television advertising without requiring PII. That case can occur by connecting STB 36 to the user's modem 32 via connection 35, in addition to connecting STB 36 to TVP 24. For example, STB 36 can be connected to a local area network (LAN) that shares device 32 for online access. In such an arrangement, network traffic is routed to a common IP address (i.e., the IP address of modem 32) for STB 36 and other devices connected to the LAN. The user can receive online access from any online

(Ex. 1001, '015 Patent, 13:17-30; Pet., Paper 2, p. 1; Reply, Paper 17, p. 4)

# The '015 Patent's CAS Accesses the Internet Without Using the Common IP Address



- The **CAS** accesses the Internet using a **different IP address** than the **common IP address** that the **modem**, a **computer**, and a **set-top box** use to access the Internet

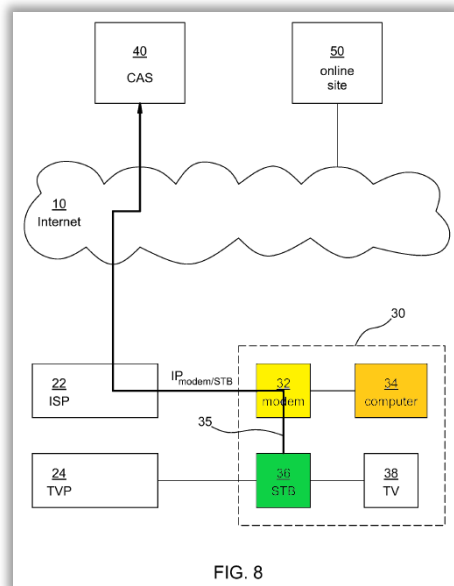
(Ex. 1001, '015 Patent, 8:38–48, 10:46–11:5, 11:6–10, FIG. 7; Reply, Paper 17, pp. 3–4)

(Ex. 1001, '015 Patent, FIG. 7, annotated; PO Resp., Paper 12, p. 3; Reply, Paper 17, pp. 3–4)

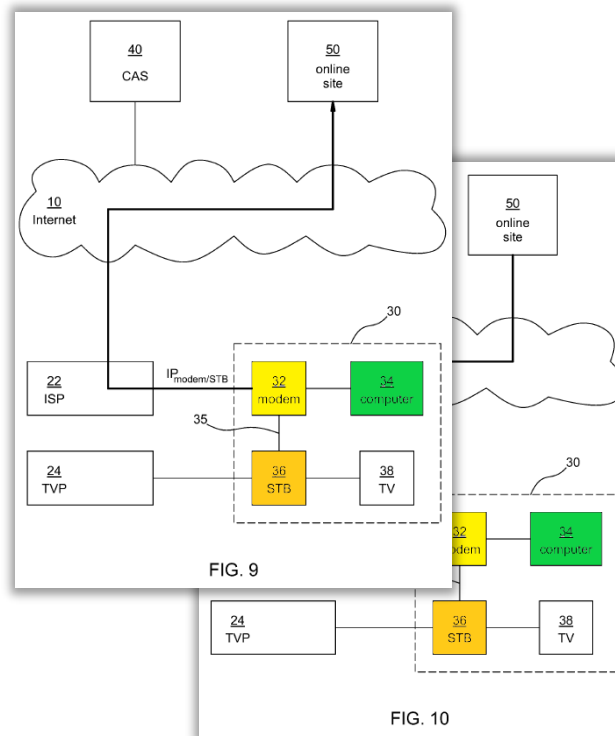
# Every System in the '015 Patent's Additional Figures 8–12 Includes the Devices that Access the Internet Using the Common IP Address

- No figure depicting the “system for targeting television advertisements” omits the devices that access the Internet using the “common IP address”

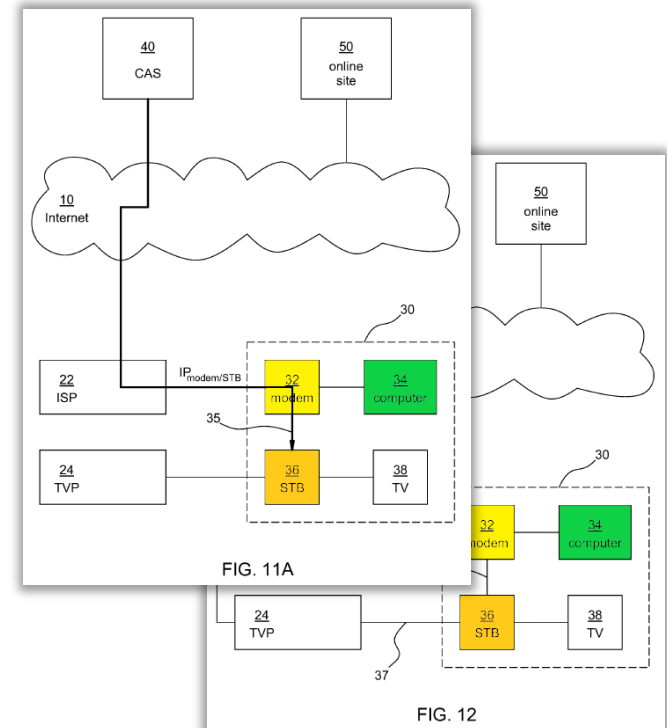
(Reply, Paper 17, pp. 4–5; *see also* Ex. 1099, de la Iglesia Tr., 42:1-16, 47:12-48:3; Pet., Paper 2, pp. 1-2; Reply, Paper 17, pp. 4-5)



(Ex. 1001, '015 Patent, FIG. 8)



(Ex. 1001, '015 Patent, FIGS. 9–10)



(Ex. 1001, '015 Patent, FIGS. 11A and 12)

## Every System in the '015 Patent's Additional Figures 8–12 Includes the Devices that Access the Internet Using the Common IP Address

- Patent Owner's expert admits that no figure depicting the “system for targeting television advertisements” omits the devices that access the Internet using the “common IP address”

(Reply, Paper 17, pp. 4–5; Ex. 1099, de la Iglesia Dep. Tr., 42:1–16 and 47:12–48:3)

8           Q.   Okay.   Can you please take a look through  
9   Figures 2 through 14 and let me know if any of the  
10   illustrated systems do not include a CAS 40, a computer  
11   34, or a set-top box 36.  
12           A.   So we're looking for 34, 36, and 40?  
13           Q.   Correct.  
14           A.   Okay.   So I can -- I can confirm that all of  
15   the figures include the elements 34, 36, and 40, with  
16   some differences of connectivity.

(Ex. 1099, de la Iglesia Dep. Tr., 42:8–16)

# The Claim Language Does Not Justify Patent Owner's Attempt to Exclude Certain Computer Systems from the Scope of the Claims

- The claims are open-ended and the '015 Patent emphasizes the claims should be construed as open-ended

(Reply, Paper 17, p. 5)

1. A computer system comprising at least one hardware server computer, wherein the computer system is programmed and connected to perform a method of using common IP addresses to identify associations among multiple electronic devices and using an identified association to cause cross-device action, the method comprising:

(Ex. 1001, '015 Patent, Claim 1 ([1A]))

mutually-exclusive alternatives. For purposes of the present disclosure or appended claims, the words “comprising,” “including,” and “having,” and variants thereof, shall be construed as open ended terminology, with the same meaning as if the phrase “at least” were appended after each instance thereof.

(Ex. 1001, '015 Patent, 24:18–23;  
see also Reply, Paper 17, p. 5)

*Genentech, v. ChironInc Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997)

“[T]he open-ended term ‘comprising’ . . . is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim[.]”

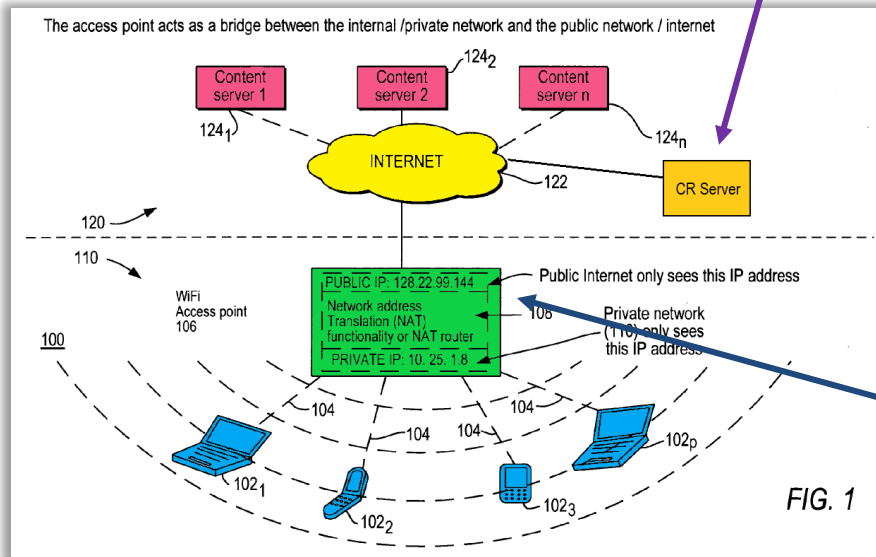
(Reply, Paper 17, p. 5)

# A Computing System Satisfies the “without using” Limitation by Accessing the Internet Using a Different IP Address

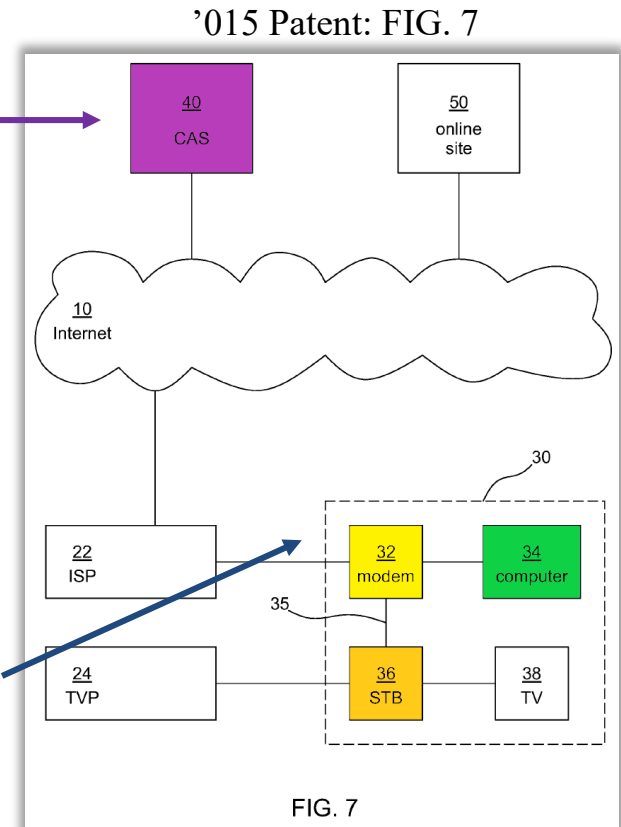
- Under [1F]’s proper interpretation, a system that accesses the Internet using a **different IP address** that is not a **common IP address** satisfies the “without using” limitation **even if** that system accesses the Internet in another instance using the common IP address

(Reply, Paper 17, pp. 5–6)

## Proposed Baig Combination



(Ex. 1001, '015 Patent, FIG. 7, annotated)



(Ex. 1001, '015 Patent, FIG. 7; Reply, Paper 17, p. 5)

## Patent Owner's Interpretation Improperly Reads Out a Disclosed Embodiment from the Scope of the Claims

- Interpreting the claimed “computer system” ([1A]) and the “without using” limitation to exclude a system that uses an IP address in addition to a common IP address is incorrect because it reads out the embodiment depicted in the ‘015 Patent’s Figures 7–12 that Patent Owner admits correspond to the claims

(PO Resp., Paper 12, p. 3; Reply, Paper 17, p. 4 fn.2 and pp. 5–6)

*Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008)

“We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.”

(Reply, Paper 17, p. 6)

# Roadmap

- Overview of the '015 Patent
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  - In Dispute
- Claim Interpretation
- **Ground A – Baig-Banga507-Banga690-McFarland Renders the Claims Obvious**
- Ground D – Baig-Zwicky-Damick Renders the Claims Obvious

## Patent Owner Disputes Only that Baig's Modified System Satisfies the “without using” Limitation

Fatally to the Petition's Ground A theory, a system that accesses the Internet using an IP address *additional to* the claimed common IP addresses (which is what the Petition alleges) is not the same as a system that accesses the Internet *without* using the claimed common IP addresses. Indeed, the Petition acknowledges that the

(PO Resp., Paper 12, p. 8)

In sum, because the Petition maps the IP address used by Baig's access point (which access point is part of the alleged “computer system determining the associations”) as the common IP address, the Petition cannot show that its Ground A theory satisfies the claim requirement that “the computer system determining the associations accesses the Internet without using any of the common IP addresses of the associations identified in part (ii)” as required by all challenged claims. Accordingly, the Petition's Ground A theory cannot succeed.

(PO Resp., Paper 12, p. 9)

## Baig's Modified System Mirrors the '015 Patent's Illustrated Embodiments

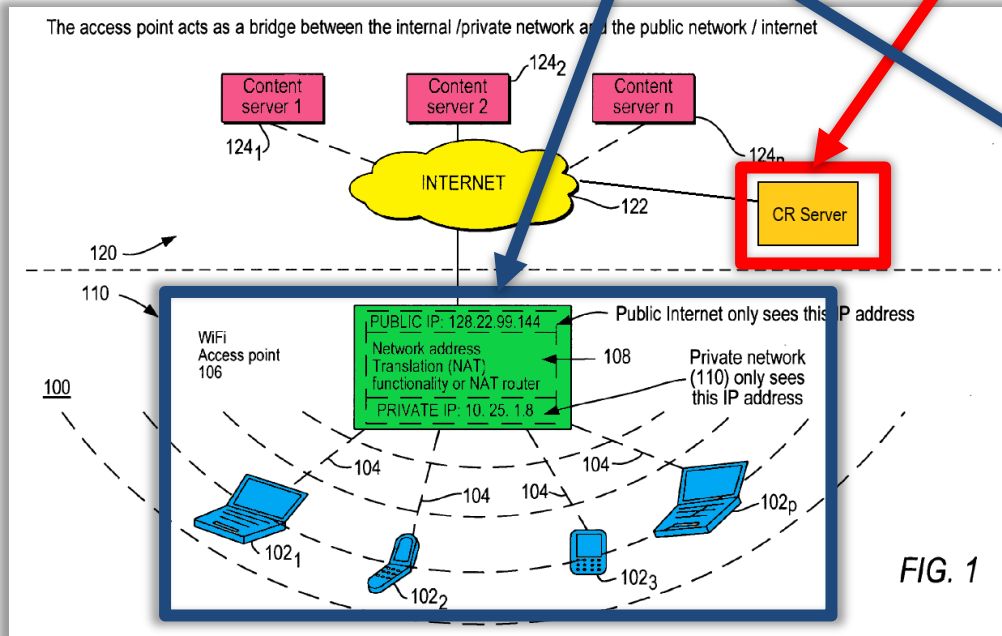
- The Petition presents Baig's modified system in a manner consistent with the open-ended “comprising” language that mirrors the '015 Patent's illustrated embodiments  
(Pet., Paper 2, pp. 13-14; Reply, Paper 17, pp. 5-7; Ex. 1007, Baig, FIG. 1; Ex. 1001, '015 Patent, FIGs. 7-12; PO Resp., Paper 12, p. 3 ; *Genentech*, 112 F.3d at 501)
- The '015 Patent's CAS that determines the associations accesses the Internet using an IP addresses that is different than the common IP address that the modem, STB, and computer use to access the Internet  
(Pet., Paper 2, pp. 13-14; Reply, Paper 17, p. 7; Ex. 1001, '015 Patent, FIG. 7)
- The CR server in Baig's modified system that determines the associations accesses the Internet using an IP addresses that is different than the common IP address that the user devices use to access the Internet  
(Pet., Paper 2, pp. 13-14; Reply, Paper 17, p. 7; Ex. 1007, Baig, FIG. 1)

# Baig's Modified System Mirrors the '015 Patent's Illustrated Embodiments

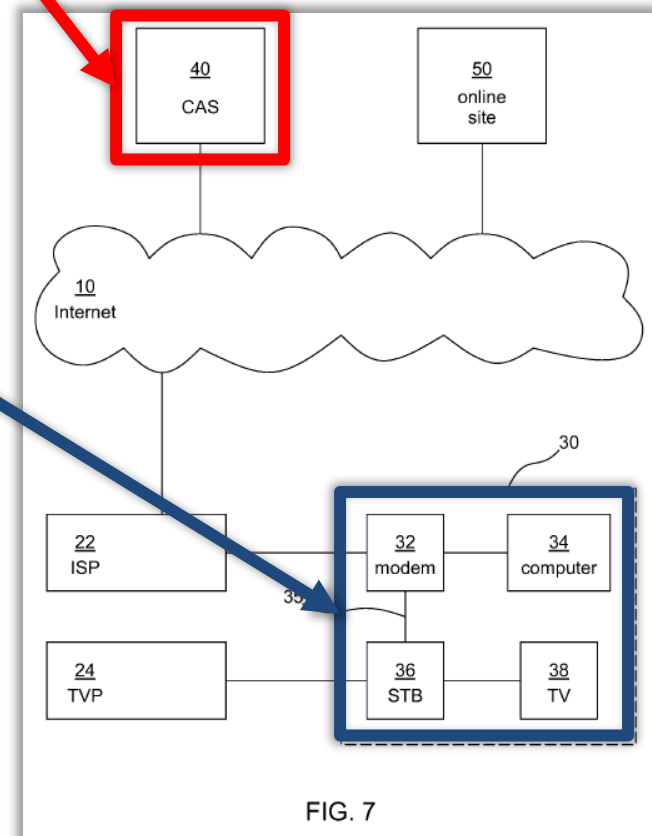
**“determin[es] the associations [and] accesses the Internet without using any of the common IP addresses” ([1F])**

**“devices [that] have accessed the Internet via a common IP address” ([1D])**

## Proposed Combination



'015 Patent: FIG. 7

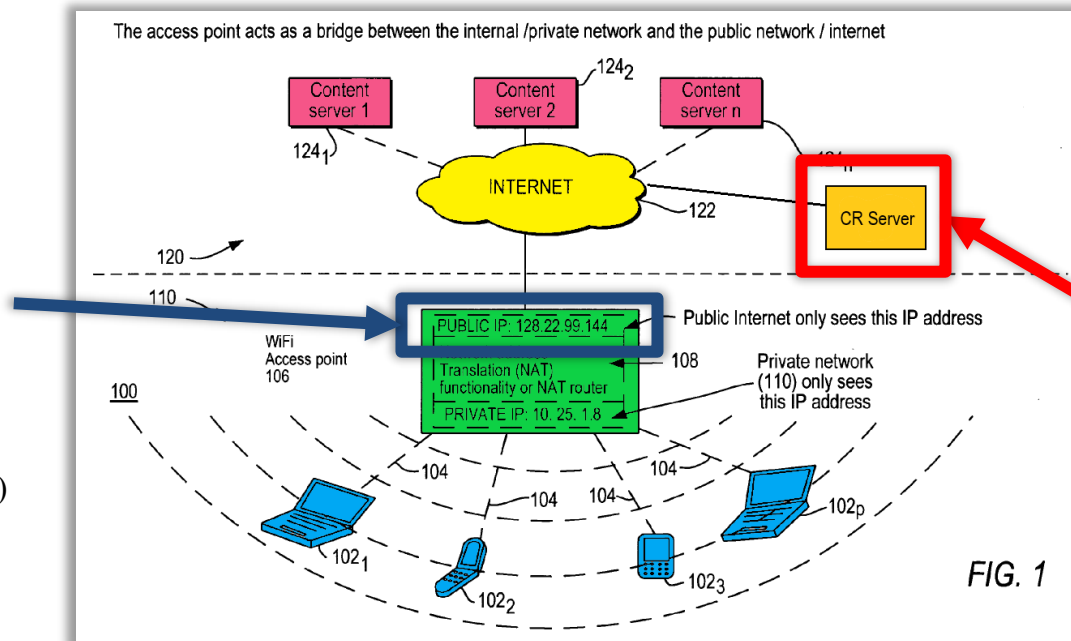


(Pet., Paper 2, p. 13; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 147-148; Reply, Paper 17, pp. 3-7; Ex. 1007, Baig, FIG. 1; Ex. 1001, '015 Patent, FIG. 7; PO Resp., Paper 12, p. 3)

# Baig's Modified System Satisfies the “without using” Limitation Because the CR Server Accesses the Internet Using an IP Address that is Different than the AP's IP Address

Internet  
access using  
the “common  
IP address”  
([1D])

(Pet., Paper 2, pp. 21–23)



Internet access  
“without using any  
of the common  
IP addresses”  
([1F])

(Pet., Paper 2, pp. 24–25;  
Ex. 1002, Lett 1<sup>st</sup> Dec.,  
¶¶ 204–206)

(Reply, Paper 17, pp. 6–7; Pet., Paper 2, pp. 24–25; Ex. 1007, Baig, FIG. 1)

## Baig's Modified System Satisfies the “without using” Limitation Because the CR Server Accesses the Internet Using an IP Address that is Different than the AP's IP Address

- The Board preliminarily held in the institution decision that Baig's modified system teaches the “without using” limitation in Element [1F], and Patent Owner provides no sound reason to change this determination

6. [1F]: “(iv) the computer system determining the associations accesses the Internet without using any of the common IP addresses of the associations identified in part (ii); and”

Petitioner asserts that in “in Baig's modified system . . . the CR server would not have connected to the Internet via the AP and thus would have used a different IP address than the AP that provides devices 102 with Internet access.” Pet. 25 (citing Ex. 1007 ¶ 43, Fig. 1; Ex. 1015, Fig. 2; Lett Decl. ¶ 205).

At this stage of the proceeding, we determine Petitioner shows sufficiently that this combination of references teaches or suggests this limitation.

(Inst. Dec., Paper 9, pp. 20–21; Reply, Paper 17, p. 7)

## If Baig's Modified System Satisfies the “without using” Limitation, Then All Claims Are Unpatentable

- Patent Owner only argues that Grounds A–C do not meet the “without using” limitation

(Pet., Paper 2, pp. 15–24 ([1A]–[1E]), 25–30 ([1G]–[1I]); PO Resp., Paper 12, pp. 6–9; Reply, Paper 17, pp. 6–7, 23–24)

- If the Baig-Banga507-Banga690-McFarland combination meets the “without using” limitation, then all claims are unpatentable under Grounds A–C

(Pet., Paper 2, pp. 9–39; PO Resp., Paper 12, pp. 6–9; Reply, Paper 17, pp. 6–7, 23–24)

- P.O. does not dispute that:
  - Ground A combination renders obvious dependent claims 2–7, 9–10, and 12–13 and counterpart claims 14–20, 22–33, and 25–26;
  - Ground B combination renders obvious dependent claims 8 and 21; or
  - Ground C combination renders obvious dependent claims 11 and 24

(Pet., Paper 2, pp. 30–43; PO Resp., Paper 12, pp. 6–9, 18; Reply, Paper 17, pp. 23–24)

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- **Ground D – Baig-Zwicky-Damick Renders the Claims Obvious**

## Ground D: Patent Owner Only Challenges Motivation and Does Not Dispute Baig-Zwicky-Damick Discloses All Claim Elements

- Patent Owner does not dispute that Baig-Zwicky-Damick discloses all claim elements, and only disputes whether using a combined IP address and port number as the claimed “device identifier” would have been obvious  
(PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 7–8)
- Patent Owner relies on nothing more than attorney argument and unsupported expert testimony to assert that a POSA would not have found it desirable or feasible to associate device IDs formed of a combined IP address and port number  
(PO Resp., Paper 12, pp. 1–2, 9–18; Reply, Paper 17, pp. 7–11, 15–16, 22–23; *see Velander v. Garner*, 348 F.3d 1359, 1371 (Fed. Cir. 2003))
- Patent Owner’s allegations about port numbers and the operation of access points are contradicted by the evidence, including Patent Owner’s own exhibits

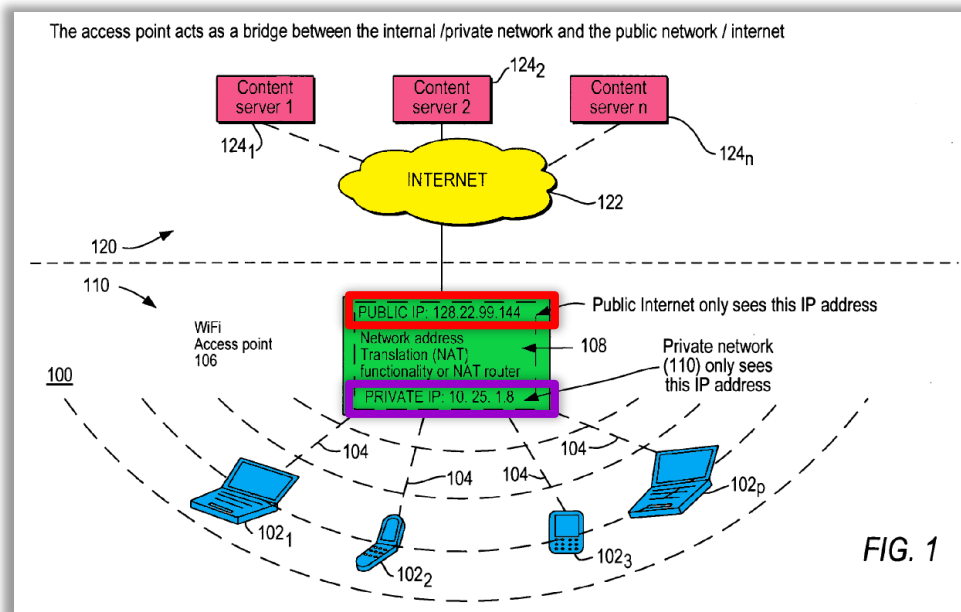
(PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 12–17; *see also* Ex. 1085, ZyXel Wireless Hotspot User’s Guide, p. 198)

## **Combination: Baig-Zwicky-Damick (Ground D)**

- Baig's system implements network address translation (NAT), which allows a network to use private IP addresses internally and a different set of public IP addresses for communicating with external networks
- Zwicky teaches port address translation (PAT), an extension of NAT, that uses port numbers to map private IP addresses to a single public IP address
- Obvious to implement PAT techniques as taught by Zwicky, as part of NAT performed in Baig's system, to allow multiple devices using a common IP address to be uniquely identified based on port numbers

(Pet., Paper 2, p. 46–51; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 341-344, 346, 349-355; Ex. 1012, Zwicky, ¶¶ 33-35, 38)

# Ground D: Combined IP Address and Port Number Discloses Claimed Device ID

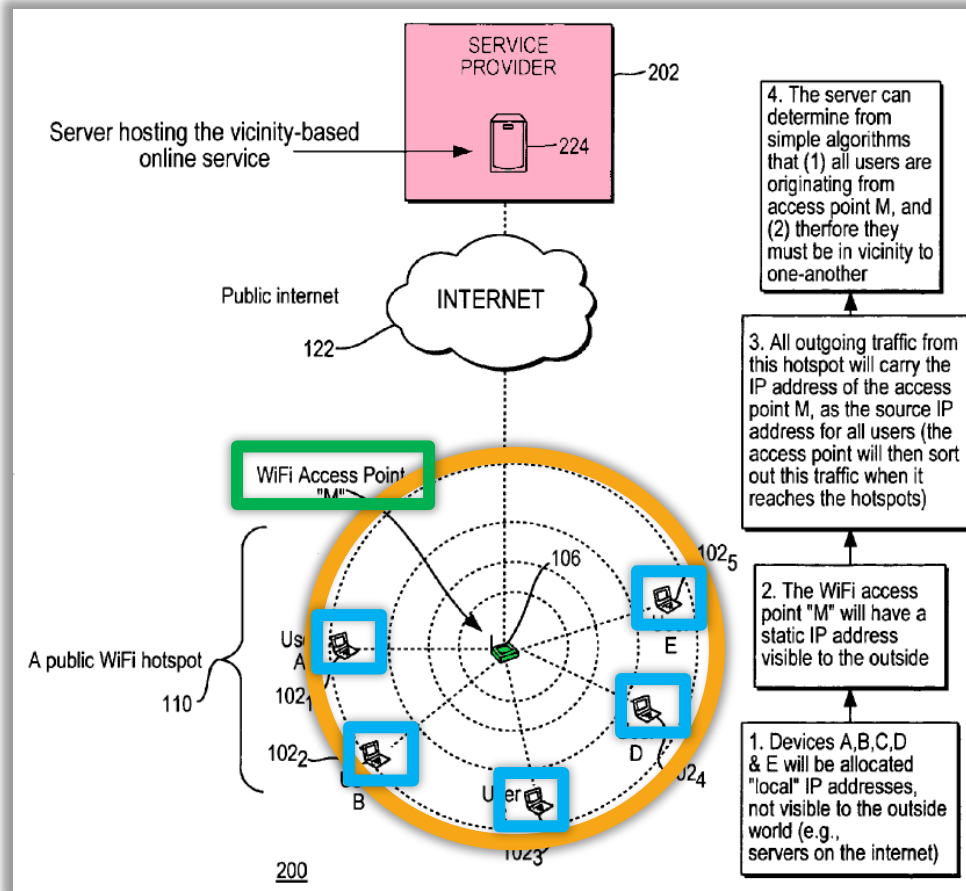


(Ex. 1007, Baig, FIG. 1, annotated)

- Baig's **access point** assigns each **user device** a **private IP address and port number** then uses NAT/PAT to map the private IP address and port number to a **public IP address and port number** for Internet communications
- '015 Patent defines “device identifier” as any temporary/permanent identifying code or data element, including an IP address

(Pet., Paper 2, pp. 43–51; Ex. 1002, Lett 1st Dec., ¶¶ 333–338, 343–344, 348–353; Ex. 1007, Baig, FIG. 1, ¶¶ 42–46, 49–51; Ex. 1012, Zwicky, pp. 33–35; Ex. 1001, '015 Patent, 15:32–47)

# Ground D: Baig's VCSP Server Associates Device IDs (IP:Port) of Devices That Access Baig's VCSP Website Via the Same AP

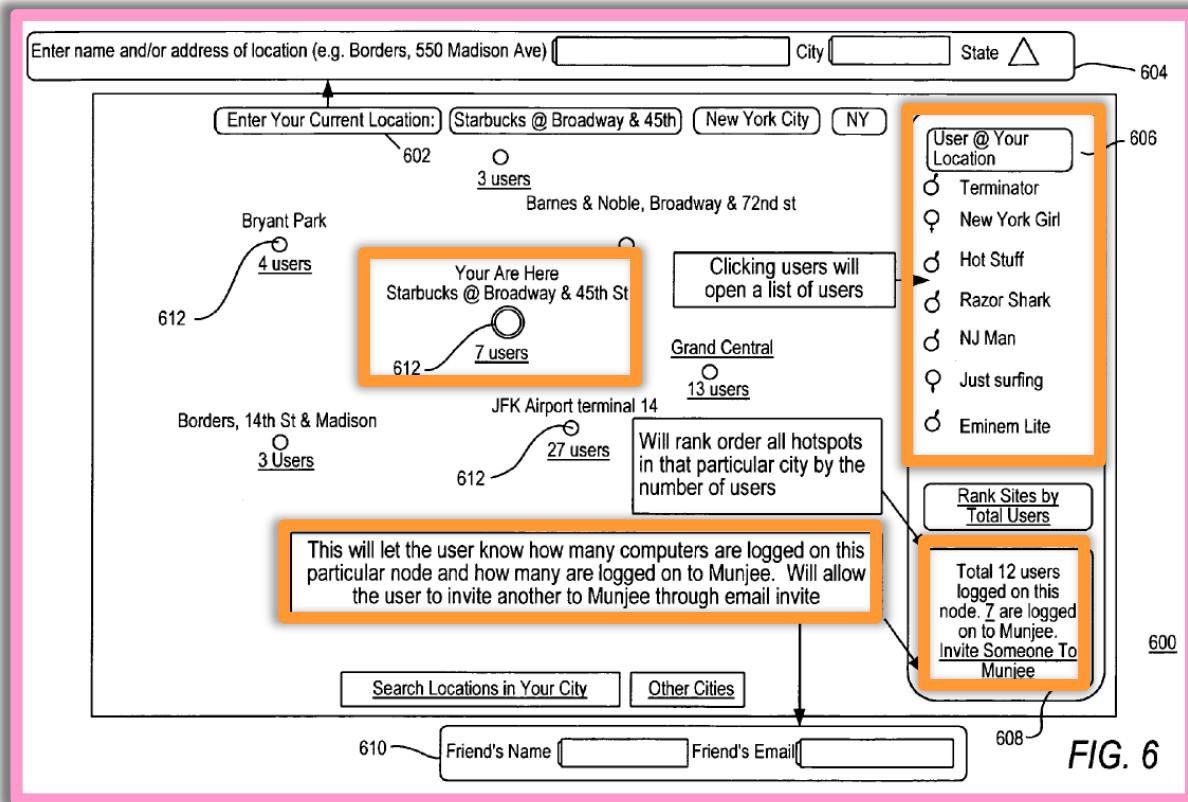


(Ex. 1007, Baig, FIG. 2)

- Baig's **VCSP server** associates the device IDs (combined IP address and port number) of the **user devices** that belong to the same **VCSP community** by connecting to the same **access point**

(Pet., Paper 2, pp. 45–47, 51–54;  
Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 333-337, 357-358, 364;  
Ex. 1007, Baig, FIG. 2)

# Ground D: Baig's VCSP Server Associates Device IDs (IP:Port) of Devices Accessing VCSP Website Via Same AP



(Ex. 1007, Baig, FIG. 6)

- Baig's **VCSP website** displays the users with associated device IDs belonging to the same **VCSP community**

(Pet., Paper 2, pp. 52-53, 63;  
Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 359-361, 363-364, 412-413;  
Ex. 1007, Baig, FIG. 6)

# P.O.'s Argument That IP:Port Combination Would be Unreliable for Device Identification is Wrong

- P.O. argues an IP:port combination would have been unreliable for device identification and unsuitable to associate device IDs in Baig-Zwicky-Damick

(PO Resp., Paper 12, pp. 10-18; Reply, Paper 17, p. 8)

- But, P.O. improperly limits Baig-Zwicky-Damick to using only non-persistent TCP connections that close after a single request/response transaction

(Reply, Paper 17, pp. 9, 11–12, 20-22; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10, 44-45, 60-62)

- In reality, *persistent connections* that are kept open for multiple request/response transactions were the default connection type in HTTP

(Reply, Paper 17, pp. 9-11, 14; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 8, 10, 30-32, 36;  
*see also* Ex. 2003, pp. 3, 4-5; Ex. 2004, p. 4; Ex. 2005, pp. 44, 47; Ex. 1075, pp. 4-5, 18)

## P.O.'s Arguments Misrepresent Baig-Zwicky-Damick as Requiring the Use of Non-Persistent TCP Connections

- Two types of TCP connections were available for transporting Internet traffic at the time of the '015 Patent

| Non-Persistent Connections                     | Persistent Connections                                      |
|------------------------------------------------|-------------------------------------------------------------|
| Closed after each request/response transaction | Kept open to perform multiple request/response transactions |

(Reply, Paper 17, pp. 9–10, 12–15, 18; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13, 28-33, 35-40, 45;  
*see also* Ex. 2004, p. 4; Ex. 1074, pp. 43–44; Ex. 1075, pp. 10–11)

HTTP can use both non-persistent connections and persistent connections. Non-persistent connections is the default mode for HTTP/1.0. Conversely, persistent connections is the default mode for HTTP/1.1.

(Ex. 2003, Computer Networking, p. 3)

- Petitioner and Mr. Lett: Contrary to P.O.'s arguments, non-persistent connections were not the only type of TCP connection available, and a POSA would have preferred (and found it obvious to) use persistent connections in the Baig-Zwicky-Damick combination

(Reply, Paper 17, pp. 9–10, 12–15, 20–21; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13, 29-33, 35-37, 44-45, 52-56, 59-62; *see also* Ex. 2003, pp. 3-5; Ex. 2004, pp. 3-4; Ex. 2005, pp. 44-47)

# A POSA Would Have Found it Obvious to Use Persistent Connections in Baig-Zwicky-Damick

- Petitioner and Mr. Lett: P.O.'s own evidence shows a POSA would have appreciated the need to decide whether to choose between non-persistent or persistent TCP connections for communications with Baig's VCSP website

(Reply, Paper 17, pp. 13–14; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 42-45; *see also* Ex. 2005, p. 44)

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, Computer Networking, p. 44)

## P.O.'s Expert Admitted Persistent Connections Were Implemented in Web Browsers/Servers in the Prior Art

- Mr. de la Iglesia agreed that a POSA would have known that HTTP/1.1 (which established persistent connections as the default TCP connection) was used in web servers nearly a decade before the '015 Patent's date of invention

(Ex. 1099, 22:14-23:6; *see also* Reply, Paper 17, pp. 10, 14; Ex. 1072, Lett 2<sup>nd</sup> Dec., ¶ 32 )

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

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

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

A. I think a person of ordinary skill in the art at the priority date of the patent that we're talking about -- so in the 2006 time frame -- would have been aware that Web servers had been using HTTP/1.1 for some time. This is -- HTTP/1.1 is a transition that happened in the 2000 time frame when we talk about a POSITA in the time of the -- at the time of the invention. Now we're thinking about the priority date of the patent.

(Ex. 1099, de la Iglesia Tr., 22:14-23:6)

# Persistent Connections Were Known to Have Significant Advantages over Non-Persistent Connections

- Petitioner and Mr. Lett: The HTTP/1.1 specification made persistent connections the default type of TCP connections due to its advantages over non-persistent connections, e.g., saving computing resources, reducing latency by sending back-to-back requests on a single connection (“pipelining”), and reducing network congestion

(Reply, Paper 17, pp. 14-15; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 33-35;  
see also Ex. 2003, pp. 3-5; Ex. 2004, pp. 3-5; Ex. 1074, p. 43; Ex. 1075, pp. 8, 19-20; Ex. 1076, pp. 2, 11; Ex. 1077, pp. 3-4)

Persistent HTTP connections have a number of advantages:

- By opening and closing fewer TCP connections, CPU time is saved, and memory used for TCP protocol control blocks is also saved.
- HTTP requests and responses can be pipelined on a connection. Pipelining allows a client to make multiple requests without waiting for each response, allowing a single TCP connection to be used much more efficiently, with much lower elapsed time.
- Network congestion is reduced by reducing the number of packets caused by TCP opens, and by allowing TCP sufficient time to determine the congestion state of the network.

(Ex. 1074, RFC 2068, p. 43)

HTTP/1.1 permits optional *request pipelining* over persistent connections. This is a further performance optimization over keep-alive connections. Multiple requests can be enqueued before the responses arrive. While the first request is streaming across the network to a server on the other side of the globe, the second and third requests can get underway. This can improve performance in high-latency network conditions, by reducing network round trips.

(Ex. 1075, HTTP: The Definitive Guide, p. 19)

# A POSA Would Have Recognized that Persistent Connections were the Best Option for Baig's VCSP Services

- A POSA would have recognized persistent connections as the best option to transport Internet traffic for Baig's real-time, interactive VCSP services, e.g., online gaming, chat rooms

(Pet., Paper 2, pp. 52–54; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 359-361; Reply, Paper 17, pp. 13–14; Ex. 1072, Lett 2<sup>nd</sup> Dec., ¶¶ 52-56; Ex. 1007, Baig, ¶¶ 53–54, 79–82, 107–110, 124; *see also* Ex. 2005, p 47)

A method and apparatus for providing vicinity-based community services at a wireless access location by a public network service provider. The method includes the steps of receiving over a public network, at least one request for vicinity-based community services from at least one end-user accessing the wireless access point, grouping end-users accessing common wireless access points, and providing the vicinity-based community services in real time to end-users accessing the public network service provider from the wireless access point. The apparatus includes devices for carrying out the method described above.

[0124] The chat-room service includes instant messaging, checking profiles, file transfers, among other features. All

(Ex. 1007, Baig, Abstract and ¶ 124)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 56)

# Persistent TCP Connections Were the Default Type of Connection for Over a Decade Before the Date of Invention

response messages that contain the objects. Through 1997 essentially all browsers and Web servers implement version HTTP/1.0, which is defined in [RFC 1945]. Beginning in 1998 Web servers and browsers began to implement version HTTP/1.1, which is defined in [RFC 2068]. HTTP/1.1 is backward compatible with HTTP/1.0; a Web server running 1.1

(Ex. 2003, Computer Networking, p. 3)

The default mode of HTTP/1.1 uses persistent connections with pipelining. In this case, the HTTP client issues a request as soon as it encounters a reference. Thus the HTTP client can make back-to-back requests for the referenced objects.

(Ex. 2003, Computer Networking, p. 5)

- Mr. Lett:

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.

Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 10; *see also* Reply, Paper 17, pp. 9–10, 14; Ex. 2004, p. 4; Ex. 2005, p. 44; Ex. 1074, pp. 1, 43-44; Ex. 1075, p. 11)

## P.O.'s Own Evidence Shows Non-Persistent Connections Had Recognized Shortcomings

- P.O.'s evidence shows that a POSA would have avoided using non-persistent connections in Baig-Zwicky-Damick given its known disadvantages due to opening a separate connection for each request—e.g., increased latency, server overhead, and network congestion

(Reply, Paper 17, pp. 14-15; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 29-31; *see also* Ex. 2003, pp. 3-5; Ex. 2004, pp. 3-4, 7-10; Ex. 2005, pp. 44-47; Ex. 1074, p. 43; Ex. 1077, p. 3)

Non-persistent connections have some shortcomings. First, a brand-new connection must be established and maintained for *each requested object*. For each of these connections, TCP buffers must be allocated and TCP variables must be kept in both the client and server. This can place a significant burden on the Web server, which may be serving requests from hundreds of different clients simultaneously. Second, as we just described, each object suffers a delivery delay of two RTTs—one RTT to establish the TCP connection and one RTT to request and receive an object.

(Ex. 2005, Computer Networking, p. 44)

Due to TCP's three-way handshake [7] there is a fair amount of latency in establishing each new connection. Therefore it would be beneficial to *reuse* the TCP connections to make multiple HTTP requests over a single connection. For this reason, an extension to the HTTP/1.0 pro-

(Ex. 2004, Web Proxy Servers, p. 3)

## **P.O. Improperly Ignores the Prior Art's Teachings about Non-Persistent and Persistent Connections**

- Patent Owner improperly ignores the prior art's teachings about the drawbacks of non-persistent TCP connections and the advantages of persistent TCP connections when arguing that port numbers necessarily would have been rapidly recycled

(PO Resp., Paper 12, pp. 9-18; Reply, Paper 17, pp. 15-16)

*In re Wesslau, 353 F.2d 238, 241 (CCPA 1965)*

“It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.”

(Reply, Paper 17, p. 15)

## Port Numbers Assigned to Persistent Connections Would Have Persisted When Interacting with Baig's Website

- Persistent connections were the default and preferred type of connection at the time of invention

(Reply, Paper 17, pp. 9–11, 14)

- TCP connections at Baig's user devices, access point, and server would have persisted for the devices interacting with Baig's VCSP website

(Reply, Paper 17, pp. 16–17)

- Port numbers assigned to the persistent connections in Baig-Zwicky-Damick would not have been quickly recycled as Patent Owner argues but instead would have remained assigned to the TCP connection to Baig's website

(Reply, Paper 17, pp. 16–17)

- Port numbers assigned to persistent connections would have been suitable to identify devices in Baig-Zwicky-Damick

(Reply, Paper 17, p. 17)

## **P.O.'s Arguments Against a Motivation to Combine are Based on the False Premise that Port Numbers Must Rapidly Change**

- P.O. contends that rapid recycling of port numbers in Baig-Zwicky-Damick would not allow for any reasonable device identification, thus preventing the proposed combination

(PO Resp., Paper 12, pp. 1–2, 9–10, 12-18; Reply, Paper 17, pp. 7–8, 17)

- This argument fails because port numbers associated with devices in Baig-Zwicky-Damick's system need not be reassigned rapidly as P.O. argues but instead remain assigned to the TCP connection to Baig's VCSP website for the duration of that connection, including idle periods

(Reply, Paper 17, pp. 8–12, 16-18, 20-21; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13, 36, 41-42, 44-45, 59-62; *see also* Ex. 1097, RFC2663, pp. 3-4; Ex. 1088, Data Center Fundamentals, p. 4; Ex. 1085, ZyXel Wireless Hotspot User's Guide, p. 198)

## Device's IP:Port Would Persist For Duration of Online Session

- In reality, an IP:port combination would have remained the same as long as Baig's user device continued interacting with Baig's VCSP website

(Reply, Paper 17, pp. 15-21; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 37-39, 41-42, 44-46, 57-62; *see also* Ex. 2003, p. 5; Ex. 1085, p. 198; Ex. 1088, p. 4; Ex. 1090, p. 92; Ex. 1092, pp. 44-46; Ex. 1093, pp. 4-5; Ex. 1094, p. 18; Ex. 1095, pp. 1-2; Ex. 1097, pp. 3-4; Ex. 1098, p. 5)

With persistent connections, the server leaves the TCP connection open after sending responses. Subsequent requests and responses between the same client and server can be sent over the same connection. In particular, an entire Web page (in the example above, the base HTML file and the ten images) can be sent over a single persistent TCP connection; moreover, multiple Web pages residing on the same server can be sent over one persistent TCP connection. Typically, the HTTP server closes the connection when it isn't used for a certain time (the timeout interval), which is often configurable. There are two versions of persistent connections: **without pipelining** and **with pipelining**. For the

(Ex. 2003, Computer Networking, p. 5)

### TCP Timeout

When a server is disconnected from the network or powered down, no data flows back to the client, and the connection can stay idle for hours. The TCP stack can keep a connection idle for a configurable amount of time. Because the default is typically two or three hours, however, it is up to the application to age out connections.

\* \* \*

If the application keeps the TCP connection idle for more than 2 hours, the TCP stack sends a *TCP keepalive* to verify that the peer entity (client or server) is still alive. The sender not

(Ex. 1088, Data Center , pp. 4-5)

### 4.2.3.6 TCP Keep-Alives

Keep-alive packets MUST only be sent when no data or acknowledgement packets have been received for the connection within an interval. This interval MUST be configurable and MUST default to no less than two hours.

(Ex. 1090, RFC 1122, p. 92)

# P.O.'s Arguments Against a Motivation to Combine are Based on the False Premise that Port Numbers Must Rapidly Change

- Port numbers associated with devices in Baig-Zwicky-Damick's system would not rapidly recycle for persistent connections

(Reply, Paper 17, pp. 8–12, 16–18, 20–21;  
Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10–13, 36, 41–42, 44–45, 60–62)

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,

\* \* \*

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 11, 13)

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

\* \* \*

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.

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 42)

# There is No Justification for Limiting Baig-Zwicky-Damick to the Use of Non-Persistent TCP Connections

- Baig-Zwicky-Damick combination does not require non-persistent connections and does not exclude persistent connections

(Reply, Paper 17, pp. 9–10, 15–16, 20–22)

- A POSA would have understood that Baig’s VCSP server and user devices would have used HTTP version 1.1 which used persistent connections as the default type of connection

(Reply, Paper 17, pp. 9–11, 14; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 35-36, 52-56; *see also* Ex. 1074, HTTP/1.1 Specification, pp. 43–44; Ex. 1075, HTTP Definitive Guide, pp. 10–11; Ex. 2003, Computer Networking, p. 5)

- A POSA would have known that access points available at the time of invention kept TCP connections open for multiple request/response transactions

(Reply, Paper 17, pp. 9–10, 19–22; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13; Ex. 1085, ZyXel Wireless Hotspot User’s Guide, p. 198)

# Patent Owner Recognizes that Rapid Port Number Recycling Was Not Necessary

- Patent Owner and Mr. de la Iglesia tacitly acknowledge that assigned port numbers would not have necessarily been rapidly recycled

(P.O. Resp., Paper 12, pp. 12, 15; Reply, Paper 17, p. 12; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 41)

source ports. Any given port in use 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 also be reassigned quickly, likely only a few seconds

(PO Resp., Paper 12, p. 12; *see also* Ex. 2001, de la Iglesia Dec., ¶ 34)

In the context of the Petition's Baig combination, where a Wi-Fi access point makes use of network address translation, ephemeral ports may have been recycled on the order of just a few seconds (or even faster), and any external knowledge of those port numbers would become stale and incorrect very quickly. Ex. 2001, ¶38.

(PO Resp., Paper 12, p. 15; *see also* Ex. 2001, de la Iglesia Dec., ¶ 38)

## P.O.'s Arguments Ignore That Port Numbers Were Known to Be Suitable for Device Identification

- P.O.'s unsupported arguments contradict the prior art, particularly Satapati, which recognized that port numbers were used to identify different devices with the same IP address.

(Reply, Paper 17, p. 11; Ex. 1072, Lett 2<sup>nd</sup> Dec., ¶¶ 10, 15-16; Ex. 1006, Satapati, ¶ 2; *see also* Pet., Paper 2, pp. 47-49; Ex. 1002, Lett 1<sup>st</sup> Dec., ¶¶ 338, 340, 342, 344-347)

devices using the Internet at one time is limited to the available number of IPv4 addresses allocated to the private network. In the alternative, the NAT may use port address translation, where port numbers are used to further identify different devices with the same address.

(Ex. 1006, Satapati, ¶ 2)

Mr. de la Iglesia's conclusions contradict the teachings of the prior art. Ex. 1072, ¶¶ 8, 15-16, 37-40, 43, 49-50, 58, 62. For example, Satapati recognized that port numbers may be used to "identify different devices with the same [IP] address." Ex. 1006, ¶¶ 2, 4-10; Pet. 47-48. PO simply ignores Satapati's teachings that port numbers were used for device identification. POR 9-18; Ex. 1006, ¶ 2 ("NAT may use port address translation, where port numbers are used to further identify different devices with the same address"). The only evidence PO relies on for its argument is uncorroborated testimony from its expert. POR 9-10, 12-15 (citing Ex. 2001, ¶¶ 30-

(Reply, Paper 17, p. 11)

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).

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 16)

# P.O.'s Alleged Workability Concerns Would Not Dissuade POSA From The Proposed Combination

- A POSA would have the requisite skill and knowledge to address workability and feasibility concerns alleged by P.O., and would not have been dissuaded from using IP:Port combination as a device identifier

(Reply, Paper 17, pp. 17-20; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 23, 42, 45-48, 57-60; *see also NuVasive, Inc., v. Iancu*, 752 F. App'x. 985, 998 (Fed. Cir. 2018))

A POSA is “a person of ordinary creativity, not an automaton.” *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1343 (Fed. Cir. 2020). PO fails to provide any evidence that these so-called issues of unreliability and feasibility were beyond a POSA’s skill to address by, for example, configuring a browser to open a persistent, pipelined connection to communicate with Baig’s server; using known mechanisms (e.g., keep-alive signals) to preserve an established connection with Baig’s server; and/or maintaining at least one persistent connection with Baig’s server while also permitting additional connections to be opened as needed. Ex. 1072, ¶¶ 19, 23, 30-32, 37-40, 48-51, 57-60; *NuVasive, Inc., v. Iancu*, 752 F. App'x. 985, 998 (Fed. Cir. 2018) (upholding Board’s finding of obviousness because “[PO]’s expert testimony regarding the inoperability of the combination ... is mere speculation and conclusory”). That failure is fatal given that it was known at the time

(Reply, Paper 17, p. 19)

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

\* \* \*

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,

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 62)

## **P.O.'s Expert Incorrectly Asserts That APs, Servers, and Web Browsers Were Incapable of Implementing Persistent Connections**

- Mr. de la Iglesia asserts, without evidence, that persistent connections (while known since 1997) were not implemented in wireless access points, web servers, or web browsers by 2007

(Ex. 1099, de la Iglesia Tr., 32:13-23, 38:16-21, 52:9-24)

- Mr. de la Iglesia is wrong. In reality, wireless APs, web servers, and web browsers configured to implement persistent connections were well-known prior to the '015 Patent's date of invention in 2007

(Reply, Paper 17, pp. 15, 19-20, 21-22; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13, 25, 37-40, 49-50)

# Access Points that Kept TCP Connections Open with the Same Port Number Were Known Prior To 2007

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 |
|-----|---------|-------------|-------------|-----------|----------------|-------------|------|
| 2   | TCP     | 192.168.1.2 | 1828        | 50045     | 172.22.0.3     | 427         | 25   |
| 3   | UDP     | 192.168.1.2 | 1970        | 50010     | 172.23.5.19    | 445         | 51   |
| 4   | UDP     | 192.168.1.2 | 1994        | 50014     | 168.95.1.1     | 53          | 25   |
| 5   | UDP     | 192.168.1.2 | 1997        | 50017     | 168.95.1.1     | 53          | 25   |
| 6   | UDP     | 192.168.1.2 | 1998        | 50018     | 168.95.1.1     | 53          | 25   |
| 7   | UDP     | 192.168.1.2 | 2002        | 50022     | 168.95.1.1     | 53          | 25   |
| 8   | UDP     | 192.168.1.2 | 2003        | 50023     | 168.95.1.1     | 53          | 25   |
| 9   | TCP     | 192.168.1.2 | 2005        | 50025     | 168.95.1.1     | 53          | 25   |
| 10  | TCP     | 192.168.1.2 | 2006        | 50026     | 64.86.142.112  | 80          | 25   |
| 11  | TCP     | 192.168.1.2 | 2007        | 50027     | 64.86.142.112  | 80          | 25   |
| 12  | TCP     | 192.168.1.2 | 2009        | 50029     | 64.154.81.197  | 80          | 25   |
| 13  | UDP     | 192.168.1.2 | 2012        | 50032     | 168.95.1.1     | 53          | 25   |
| 14  | TCP     | 192.168.1.2 | 2015        | 50035     | 168.95.1.1     | 53          | 25   |
| 15  | TCP     | 192.168.1.2 | 2016        | 50036     | 64.233.167.147 | 80          | 25   |
| 16  | TCP     | 192.168.1.2 | 2017        | 50037     | 168.95.1.1     | 53          | 25   |
| 17  | TCP     | 192.168.1.2 | 2018        | 50038     | 209.133.56.106 | 80          | 25   |
| 18  | UDP     | 192.168.1.2 | 2019        | 50039     | 168.95.1.1     | 53          | 25   |

1 Page First Previous Next End

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 <b>First</b> to go to the first page.                                                                                                                                                                                                                                               |
| Previous    | Click <b>Previous</b> to return to the previous page.                                                                                                                                                                                                                                     |
| Next        | Click <b>Next</b> to go to the next page.                                                                                                                                                                                                                                                 |
| End         | Click <b>End</b> 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, ZyXel Wireless Hotspot User's Guide, p. 198, Fig. 95 & Table 53)

- Access point keeps **TCP connections** open as long as there is network traffic to reset the **idle period** (five minutes for TCP connections)

(Reply, Paper 17, pp. 10, 15, 19–20; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10-13; Ex. 1085, ZyXel Wireless Hotspot User's Guide, p. 198)

# Web Servers that Kept TCP Connections Open with the Same Port Number Were Known Prior To 2007

- Contrary to P.O.'s expert's assertions, multiple web servers (e.g., Oracle, Microsoft, Apache) implemented persistent connections to keep TCP connections open prior to the '015 Patent's date of invention in 2007

## Keep Alive and TCP Connection Timeout

The default IIS configuration has HTTP keep-alive enabled. HTTP is a stateless protocol, and each HTTP request from a client to the Web server causes a connection to be established, serviced, and then closed. If the Web server were to set up and close TCP connections for each HTTP request, this would cause serious performance issues. 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.

In addition to this parameter, a TCP connection timeout parameter can be set. This is the amount of time that idle TCP connections will be left open. Figure 13-13 shows these parameters being configured.

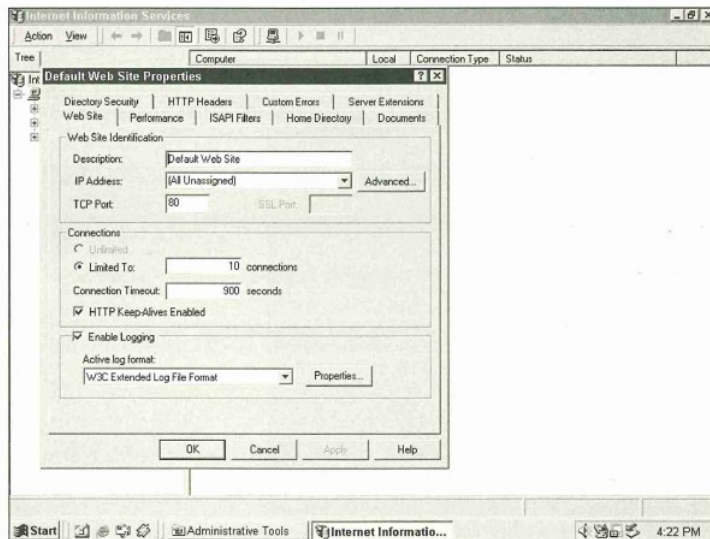


Figure 13-13: Tuning IIS with options for Keep-Alive and Connection Timeout.

(Ex. 1093, Microsoft IIS Server, p. 5)

(Reply, Paper 17, pp. 10-11, 15, 19-22; Ex. 1072, Lett 2nd Dec. ¶¶ 10, 39-40; *see also* Ex. 1099, de la Iglesia Tr., 32:13-33:21, 36:14-37:3; 52:9-24; Ex. 1092, Oracle HTTP Server, pp. 44-46; Ex. 1093, Microsoft IIS Server, pp. 4-5; Ex. 1094, Apache HTTP Server, p. 18)

## KeepAlive

Enables HTTP 1.1 keep-alive support, allowing reuse of the same TCP connection for multiple HTTP requests from a single client, when set to "On". The default is "On".

**See Also:** "KeepAlive directive" in the Apache Server documentation.

(Ex. 1092, Oracle HTTP Server, p. 46)

## KeepAlive Directive

**Description:** Enables HTTP persistent connections

**Syntax:** KeepAlive On|Off

**Default:** KeepAlive On

**Context:** server config, virtual host

**Status:** Core

**Module:** core

The Keep-Alive extension to HTTP/1.0 and the persistent connection feature of HTTP/1.1 provide long-lived HTTP sessions which allow multiple requests to be sent over the same TCP connection. In some cases this has been shown to result in an almost 50% speedup in latency times for HTML documents with many images. To enable Keep-Alive connections, set KeepAlive On.

(Ex. 1094, Apache HTTP Server, p. 18)

# Web Browsers Available Prior to 2007 Supported Request Pipelining For Persistent Connections

Pipelining allows Opera to make multiple requests without waiting for an answer. Basically it is the difference between calling someone multiple times asking for different items versus calling once with a list. A list is obviously more efficient!

Chunking is the splitting up of documents. Once chunked the document can be sent over a persistent connection through a pipeline. Each chunk is a known length so by splitting up the document in chunks even documents that have no known length can be sent.

(Ex. 1095, Opera, p. 2)

As has been shown, GPRS and EGPRS connections behave differently when used for web surfing compared to fixed-line connections. As most users access the Internet via fixed-line connections, web browsers are usually optimized for short latency and very high bandwidth connections. However, some browsers allow changing their network access settings which can help to improve the download times. The Firefox browser for example allows changing the values for pipelining of web requests. Pipelining is a method which was introduced with HTTP 1.1 to request several elements of a page at once in a single TCP connection instead of only sending the next request once the previous element was downloaded. In this way it is possible to reduce the effect of the higher latency of the wireless connection.

Pipelining is activated in the Firefox browser as follows:

- In the URL field, `about:config` has to be entered to get the list of all parameters that can be changed.
- Pipelining is activated by setting the `network.http.pipelining` parameter to `TRUE`.
- A good value for the number of accumulated requests that should be set in `network.http.pipelining.maxrequests` is eight.

(Ex. 1098, Communication Systems, p. 5)

- Contrary to Mr. de la Iglesia's assertions, request pipelining was a feature implemented in multiple web browsers (e.g., Opera, Firefox) at the time of the '015 Patent's date of invention in 2007

(Reply, Paper 17, pp. 18–19; Ex. 1072, Lett 2nd Dec. ¶¶ 22, 39, 50; Ex. 1095, Opera, pp. 1–2; Ex. 1098, Communication Systems, p. 5; *see also* Ex. 1099, de la Iglesia Tr., 38:16-39:13)

## P.O.'s Arguments Are Undermined By The Fact That APs Were Known To Use Persistent Connections For Client-Server Communication

- P.O.'s argument that port numbers assigned by Baig's AP "must be quickly recycled" to support other users/devices is belied by the fact that wireless APs were designed to maintain persistent connections between client devices and a host server

(PO Resp., Paper 12, pp. 9-10, 12-17; Reply, Paper 17, pp. 10, 15, 18-20; Ex. 1072, Lett 2nd Dec. ¶¶ 10-13, 17-18, 41-42; Ex. 1085, ZyXel Wireless Hotspot User's Guide, pp. 1, 198)

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,

\* \* \*

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,

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 10, 11)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 13)

## P.O.'s Assertion That Port Numbers Would Rapidly Change During A Same User's Communication Session Ignores The Prior Art

- P.O. and Mr. de la Iglesia assert that port numbers in Baig's system would change and be allocated to different devices at any moment during a user's online session

(PO Resp., Paper 12, pp. 13-14; Ex. 2001, de la Iglesia Dec., ¶ 35)

- This argument is not supported. P.O.'s assertion ignores any consideration of persistent connections and is premised on Baig's system using less preferred non-persistent connections

(Reply, Paper 17, pp. 10-12, 14-17, 22; Ex. 1072, Lett 2nd Dec., ¶¶ 10, 29-32, 36-37, 41, 45-46, 59; see also Ex. 2003, p. 5; Ex. 2004, p. 4; Ex. 2005, p. 44; Ex. 1075, p. 18)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 45)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 59)

Unlike HTTP/1.0+ keep-alive connections, HTTP/1.1 persistent connections are active by default. HTTP/1.1 assumes *all* connections are persistent unless otherwise indicated. HTTP/1.1 applications have to explicitly add a Connection: close header

(Ex. 1075, HTTP: The Definitive Guide, p. 18)

## P.O.'s Arguments Ignore That Port Numbers Were Known to Be Suitable for Device Identification

- P.O. relies on the uncorroborated testimony of its expert to argue that using port numbers for device identification, as taught in the prior art, was not known and would have been impractical to implement

(PO Resp., Paper 12, pp. 10-11, 13-14, 16-17;  
Ex. 2001, de la Iglesia Dec., ¶¶ 33, 35, 43-44)

- Federal Circuit: “To contradict a reference, an unsupported opinion is not substantial evidence.”  
(*Ericsson Inc. v. Intellectual Ventures I LLC*, 890 F.3d 1336, 1346 (Fed. Cir. 2018); Reply, Paper 17, p. 11)

*Homeland Housewares, LLC v. Whirlpool Corp.,  
865 F.3d 1372, 1378 (Fed. Cir. 2017)*

“[W]e must disregard the testimony of an expert that is plainly inconsistent with the record.”

(Reply, Paper 17, p. 11)

## P.O.'s Argument That IP:Port Combination Would be Impractical For Device Identification Is Incorrect

- P.O. contends that using an IP:port combination as a device ID would be impractical since Baig's AP could not allocate enough port numbers in advance to accommodate parallel TCP connections for an unknown number of devices  
(PO Resp., Paper 12, p. 11; see also Ex. 2001, de la Iglesia Dec., ¶ 32)
- P.O. incorrectly assumes that multiple parallel connections are required to access Baig's website, and overlooks that a sufficient quantity of port numbers would have been available to Baig's AP even if devices opened parallel connections  
(Reply, Paper 17, pp. 18-19; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 17-24, 26-28, 57-58)

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

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 26)

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 26)

## P.O.'s Argument That Multiple Parallel TCP Connections Are Required to Interact with Baig's VCSP Website Is Wrong

- P.O. argues that the web browsers in Baig-Zwicky-Damick would have opened multiple, parallel TCP connections to access Baig's VCSP website  
(PO Resp., Paper 12, pp. 11–12, 15–16)
- A POSA would have recognized that a single, persistent, pipelined connection would have been sufficient (and preferred) for Internet traffic between Baig's user devices and VCSP website

(Reply, Paper 17, pp. 17–19; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 19-23, 48-50, 57; see also Ex. 2003, p. 4; Ex. 2004, pp. 5, 8-10; Ex. 2005, pp. 45-46; Ex. 1076, p. 1; Ex. 1077, p. 4)

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.

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 23)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 48)

# P.O.'s Evidence Does Not Support How Web Browsers Necessarily Would Have Operated

content from the servers hosting Baig's website. Ex. 2001, ¶33. 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* 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."); Ex. 2004 at 6 (original page 50) ("**Many Web clients**, such as Netscape Navigator, open up several connections simultaneously, so that the document text (HTML) and its for the previous one to finish before starting the next one."). As explained by Mr. de la Iglesia, 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). Ex. 2001 ¶33; Ex. 2004 at 6 (Fig. 4.2 showing "[m]ultiple simultaneous connections [by a single client] to increase speed and provide better perceived performance"). That same approach was prevalent both

(PO Resp., Paper 12, pp. 11-12)

- Patent Owner improperly conflates the default mode of some web browsers with how all web browsers necessarily would have operated  
(PO Resp., Paper 12, pp. 11-12, 15-16; Reply, Paper 17, pp. 17-19)
- Web browsers allowed users to limit the maximum number of parallel connections, e.g., to a single connection  
(Reply, Paper 17, pp. 18-19; Ex. 2003, Computer Networking, p. 4; Ex. 2005, Computer Networking, pp. 45-46)
- HTTP Secure ("https") uses a single connection  
(Reply, Paper 17, pp. 18-19; Ex. 1087, Firewalls, pp. 5-6)

## P.O.'s Argument That A POSA Would Be Required To Constantly Reconfigure Connection Table Ports Misreads Baig-Zwicky-Damick

- P.O. argues that the need to “reverse-engineer” the constantly changing connection table ports of Baig-Zwicky-Damick’s AP would prevent the proposed combination  
(PO Resp., Paper 12, pp. 14-15)
- P.O.’s argument is not supported, and is irrelevant since use of persistent connections would allow Baig’s server to assume that a same port would be reused by a device during an online session

(Reply, Paper 17, pp. 16-19; Ex. 1072, Lett 2nd Dec. ¶¶ 37-39, 45-46, 59-61; see also Ex. 2004, p. 3; Ex. 1075, p. 11; Ex. 1092, p. 46)

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

(Ex. 1072, Lett 2nd Dec. ¶ 46)

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.

(Ex. 1072, Lett 2nd Dec. ¶ 46)

connections are closed after each transaction. Persistent connections stay open across transactions, until either the client or the server decides to close them.

By reusing an idle, persistent connection that is already open to the target server, you can avoid the slow connection setup. In addition, the already open connection can

(Ex. 1075, HTTP: The Definitive Guide, p. 11)

# P.O.'s Alleged Infeasibility of IP:Port as a Device ID is Wrong, And Would Not Dissuade a POSA From The Proposed Combination

- P.O. argues that a POSA would not have been able or motivated to create associations between IP:port combinations due to rapid port reassignments  
(PO Resp., Paper 12, pp. 9-10, 13-16)
- P.O. wrongly assumes that devices in Baig-Zwicky-Damick would have used multiple ports simultaneously to connect to Baig's server rather than a port assigned to a persistent connection  
(epl, Paper 17, pp. 10, 12, 15-19; Ex. 1072, Lett 2nd Dec. ¶¶ 35-39, 41-42, 44-46, 57-62)

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

\* \* \*

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 42)

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,

\* \* \*

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.

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 60)

# P.O.'s Alleged Reliability Concerns Would Not Dissuade POSA From The Proposed Combination

- A POSA would have recognized that the port number assigned to a persistent connection would remain the same, thereby allowing Baig's system to reliably identify devices originating communications associated with the same IP:port combination

(Reply, Paper 17, pp. 16-21; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 37-39, 41-42, 44-46, 57-62)

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,

\* \* \*

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,

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 44)

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,

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 59)

open after transactions complete are called *persistent* connections. Nonpersistent connections are closed after each transaction. Persistent connections stay open across transactions, until either the client or the server decides to close them.

(Ex. 1075, HTTP: The Definitive Guide, p. 11 )

# Mr. de la Iglesia's Opinions are Based on His Personal Experience Years Before the Date of Invention

- Patent Owner's expert provides opinions regarding the state of the art that are limited to his personal experience in 2003, four years before the '015 Patent's date of invention in 2007

(Reply, Paper 17, pp. 21–22; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 51; Ex. 1099, de la Iglesia Tr., 10:24–12:4, 38:16–39:13, 48:23–49:9)

## Testimony About Request Pipelining in HTTP v1.1

feature. And I had personal responsibility for -- for implementing compliance with this feature at the Webstacks product as to whether or not pipelining needed to be supported. And we authoritatively determined that none of the browsers support this because this is -- this would be basically sending out multiple GETs in a stream, and that is not the way that sockets work on either the Windows or the Linux platforms. You have to

(Ex. 1099, de la Iglesia Tr., 39:1–8)

Q. And you worked at Webstacks from roughly 2000 to 2003; correct?

A. So it was -- it was Webstacks through, I think, 2001; and then that was acquired by Extreme. So I worked and supported the Webstacks product up through 2003. I was also a -- like, a -- I think it's switch design manager at Extreme for pipeline --

(Ex. 1099, de la Iglesia Tr., 49:1–7)

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

(Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶ 51)

## P.O. Mischaracterizes Port Numbers for TCP Connection as “Ephemeral” Port Numbers

- Patent Owner’s “ephemeral” port numbers were actually known as “user,” “private,” or “dynamic” port numbers available for general purposes

(PO Resp., Paper 12, pp. 10, 13–15; Reply, Paper 17, p. 9 fn.4; Ex. 2006, TCP/IP Guide, p. 1)

|                                       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Registered (User) Port Numbers</b> | 1,024 to 49,151  | There are many applications that need to use TCP/IP but are not specified in RFCs, or are not so universally used that they warrant a worldwide well-known port number. To ensure that these various applications do not conflict with each other, IANA uses the bulk of the overall port number range for registered port numbers. Anyone who creates a viable TCP/IP server application can request to reserve one of these port numbers, and if approved, the IANA will register that port number and assign it to the application.<br><br>These port numbers are generally accessible by any user on a system and are therefore sometimes called <i>user port numbers</i> . |
| <b>Private/Dynamic Port Numbers</b>   | 49,152 to 65,535 | These ports are neither reserved nor maintained by IANA. They can be used for any purpose without registration, so they are appropriate for a private protocol used only by a particular organization                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

(Ex. 2006, TCP/IP Guide, p. 1)

- A POSA would have understood that a “user,” “private,” or “dynamic” port number is not “ephemeral” in the sense that it is recycled rapidly if assigned to a persistent connection kept open for multiple request/response transactions

(Reply, Paper 17, p. 9 fn.4; Ex. 1072, Lett 2nd Dec. ¶ 43)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions regarding the speed of port number recycling at an access point

(PO Resp., Paper 12, pp. 15–16; Ex. 2001, de la Iglesia Dec., ¶ 38; Reply, Paper 17, pp. 22–23)

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

(Ex. 2001, de la Iglesia Dec., ¶ 38)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions about the lifetime of a port being restricted by NAT security settings and firewalls

(PO Resp., Paper 12, pp. 11–12; Ex. 2001, de la Iglesia Dec., ¶ 33; Reply, Paper 17, pp. 22–23)

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

(Ex. 2001, de la Iglesia Dec., ¶ 33)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions regarding an access point's teardown of connections

(PO Resp., Paper 12, pp. 11–12; Ex. 2001, de la Iglesia Dec., ¶ 33; Reply, Paper 17, pp. 22–23)

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.

(Ex. 2001, de la Iglesia Dec., ¶ 33)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions regarding how NAT devices like WiFi access points would have operated

(PO Resp., Paper 12, pp. 14–15; Ex. 2001, de la Iglesia Dec., ¶ 36 fn.2; Reply, Paper 17, pp. 22–23)

<sup>2</sup> 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.

(Ex. 2001, de la Iglesia Dec., ¶ 32 fn.2)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions about the prevalence of “higher-complexity elements” of websites in 2006–2007

(PO Resp., Paper 12, p. 15; Ex. 2001, de la Iglesia Dec., ¶ 37; Reply, Paper 17, pp. 22–23)

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

(Ex. 2001, de la Iglesia Dec., ¶ 37)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

- Patent Owner's expert provides no evidence to support his assertions regarding the assignment and reassignment of ports at an access point

(PO Resp., Paper 12, p. 12; Ex. 2001, de la Iglesia Dec., ¶ 34; Reply, Paper 17, pp. 22–23)

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

(Ex. 2001, de la Iglesia Dec., ¶ 34)

# Patent Owner's Unsupported Expert Testimony is Entitled to Little Weight If Any

## 37 C.F.R. § 42.65(a)

“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”

## *Upjohn Co. v. Mova Pharm. Corp.*, 225 F.3d 1306, 1311 (Fed. Cir. 2000)

“Lack of factual support for expert opinion going to factual determinations, however, may render the testimony of little probative value in a validity determination.”

## *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (PTAB Aug. 24, 2022)

“[T]he cited declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight.”

(Reply, Paper 17, p. 23)

## **If Ground D Provides a Sufficient Motivation, Then All Claims Are Unpatentable**

- Patent Owner does not dispute that Ground D's Baig-Zwicky-Damick combination satisfies claim elements [1A]–[1I]

(Pet., Paper 2, pp. 43–69 ([1A]–[1I]); PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 7–8, 23–24)

- Patent Owner does not dispute that the Baig-Zwicky-Damick combination renders obvious dependent claims 2–7, 9–10, and 13 and counterpart claims 14–20, 22–33, and 26

(Pet., Paper 2, pp. 69–76; PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 23–24)

- Patent Owner does not dispute any aspect of Ground E's invalidity theory for claims 1–7, 9–10, 13–20, 22–23, and 26; Ground F's and Ground G's invalidity theories for claims 8 and 21; Ground H's and Ground I's invalidity theories for claims 11 and 24; or Ground J's and Ground K's invalidity theories for claims 12 and 25

(Pet., Paper 2, pp. 43–76 (Ground E), 76–77 (Grounds F–G), 78 (Grounds H–K); PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 23–24)

## **Any Similar Challenge to Ground E Fails for the Same Reasons as Ground D**

- Patent Owner does not separately challenge Ground E's Baig-Satapati-Damick combination

(Pet., Paper 2, pp. 43–69 (Grounds D–E); PO Resp., Paper 12, pp. 9–18; Reply, Paper 17, pp. 23–24)

- To the extent Patent Owner's arguments challenging Ground D apply to Ground E, those arguments fail for the same reasons as Ground D

(Reply, Paper 17, pp. 7–24)

# Summary

- Baig-Banga507-Banga690-McFarland shows all claim elements, including the “without using” limitation under the correct interpretation of the ’015 Patent claims  
(Pet., Paper 2, pp. 9-43; Reply, Paper 17, pp. 2-7)
- PO does not dispute Baig-Zwicky-Damick shows all claim elements. Given well-known use of persistent connections and use of port numbers for device identification, it would have been obvious to use IP:port combination as claimed “device identifier”  
(PO Resp., Paper 12, pp. 9-18; Reply, Paper 17, pp. 7-24)
- P.O. argues the contrary by:
  - Misinterpreting the claims to exclude all “computer system” embodiments,
  - Mischaracterizing and ignoring the prior art,
  - Failing to give due credit to the skill and creativity of a POSA, and
  - Relying on conclusory and unsubstantiated expert testimony

(Reply, Paper 17, pp. 2-23; Ex. 1072, Lett 2<sup>nd</sup> Dec. ¶¶ 8, 10-13)