UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

FLYPSI, INC.,
Patent Owner.

Case IPR2023-00361
Patent 10,051,105

DECLARATION OF DR. ROBERT AKL IN SUPPORT OF PATENT OWNER'S RESPONSE

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I, Robert Akl, D.Sc. of Dallas, Texas, hereby state and declare:

I. INTRODUCTION

1. I am over the age of 18 and am competent to make this Declaration. I have personal knowledge, or have developed knowledge, of these technologies based upon my education, training, and/or experience, of the matters set forth herein. If called upon to do so, I would testify competently thereto.

2. I have been retained by counsel for Patent Owner Flypsi, LLC ("Flypsi") in the above matter. I am submitting this Declaration in response to the Petition for *Inter Partes* Review for U.S. Patent 10,051,105 ("'105 Patent") and in rebuttal to the declaration of Dr. Lin. Specifically, I have been asked to consider the validity of claims 1-11 of the '105 Patent (the "Challenged Claims") in view of prior art, obviousness considerations, and understanding of a person of ordinary skill in the art ("POSITA") at the time of the invention as it relates to the '105 Patent.

II. BACKGROUND AND QUALIFICATIONS

3. I am an expert in the field of telecommunication systems. I have studied, taught, practiced, and researched this field for over 28 years. I have summarized in this section my educational background, work experience, and other relevant qualifications. Exhibit 2011 is a true and correct copy of my *curriculum vitae* describing my background and experience.

4. I earned two Bachelor of Science degrees in Electrical Engineering and

Computer Science *summa cum laude* with a grade point average of 4.0/4.0 and a ranking of first in my undergraduate class from Washington University in St. Louis in 1994. In 1996, I earned my Master of Science degree in Electrical Engineering from Washington University in St. Louis with a grade point average of 4.0/4.0. I earned my Doctor of Science in Electrical Engineering from Washington University in St. Louis in 2000, again with a grade point average of 4.0/4.0, with my dissertation being on "Cell Design to Maximize Capacity in Cellular Code Division Multiple Access (CDMA) Networks."

5. While a graduate student, from 1997 through 1999, I worked at MinMax Corporation in St. Louis, where I designed software packages that provided tools to flexibly allocate capacity in a CDMA communications network and maximize the number of subscribers. I also validated the hardware architecture for an Asynchronous Transfer Mode (ATM) switch capable of channel group switching, as well as performed logical and timing simulations, and developed the hardware architecture for the ATM switch. I also worked with Teleware Corporation in Seoul, South Korea, where I designed and developed algorithms that were commercially deployed in a software package suite for analyzing the capacity in a CDMA network implementing the IS-95 standard to maximize the number of subscribers.

6. After obtaining my Doctor of Science degree, I worked as a Senior Systems Engineer at Comspace Corporation from October of 2000 to December of

2001. At Comspace, I designed and developed advanced data coding and modulation methods for improving reliability and increasing the available data rates for cellular communications. I coded and simulated different encoding schemes (including Turbo coding, Viterbi decoding, trellis coded modulation, and Reed-Muller codes) and modulation techniques using amplitude and phase characteristics and multi-level star constellations. This work further entailed the optimization of soft decision parameters and interleavers for additive white Gaussian and Rayleigh faded channels. In addition, I also extended the control and trunking of Logic Trunked Radio (LTR) to include one-to-one and one-to-many voice and data messaging.

7. In January of 2002, I joined the faculty of the University of New Orleans in Louisiana as an Assistant Professor in the Department of Electrical Engineering. While in this position, I designed and taught two new courses called "Computer Systems Design I and II." I also developed a Computer Engineering Curriculum with a strong hardware-design emphasis, formed a wireless research group, and advised graduate and undergraduate students.

8. In September of 2002, I received an appointment as an Assistant Professor in the Department of Computer Science and Engineering at the University of North Texas (UNT), in Denton, Texas. In May of 2008, I earned tenure and was promoted to the rank of Associate Professor. As a faculty member, I have taught courses and directed research in networking and telecommunications, including 2G,

3G, 4G, 5G, CDMA/WCDMA, GPS, GSM, UMTS, LTE, ad-hoc networks, antenna design and beamforming, Bluetooth, call admission control, channel coding, channel estimation, communication interfaces and standards, compression, computer architecture, MIMO systems, multi-cell network optimization, network security, packet-networks, telephony, VoIP, Wi-Fi (802.11), 802.15.4, Zigbee, wireless communication, and wireless sensors. Between January of 2015 and August of 2022, I was appointed Associate Chair of Graduate Studies in the Department of Computer Science and Engineering. In May of 2023, I was promoted to the rank of Professor.

9. I am also the director of the Wireless Sensor Lab ("WiSL") at UNT. I am a member of the Center for Information and Cyber Security (CICS). It is the only program in the U.S. to be federally certified by the National Security Agency as a Center of Academic Excellence in Information Assurance Education and Research *and* Cyber Defense Research. I was also a member of the NSF Net-Centric & Cloud Software & Systems: Industry-University Cooperative Research Center (I/UCRC). Several of my research projects are funded by industry and the National Science Foundation and published in *IEEE* conference proceedings and journals.

10. In addition to advising and mentoring students at UNT, I was asked to join the faculty of the University of Arkansas in Little Rock as an Adjunct Assistant Professor from 2004 to 2008 in order to supervise the research of two Ph.D. graduate students who were doing research in wireless communications. At UNT, I have

advised and supervised more than 250 undergraduate and graduate students, several of whom received a master's or doctorate degree under my guidance.

11. Between 2005 and 2017, I have received over a million dollars in funding from the State of Texas, Texas Higher Education Coordination Board, the National Science Foundation, and industry to design and conduct robotics, video, and mobile gaming (*e.g.*, Xbox, PC, mobile device) programming summer camps for middle and high school students at UNT. By using video and mobile gaming as the backdrop, participants have learned coding and programming principles and developed an understanding of the role of physics and mathematics in video game design.

12. Between 2011 and 2013, I was director of the Bio-Com Project that was funded by Raytheon. The project evaluated the feasibility study using Surface Electromyography (EMG) and bend resistive sensors, which are attached to each of the five fingers of the hand, for hand gesture recognition. This approach is sometimes known as a "data glove." A prototype was developed and demonstrated at Raytheon, to help soldiers in close-combat situations communicate with hand gestures and hand signals that would be recognized and transmitted to other soldiers' Head Up Display (HUD) without breaking radio silence.

13. In addition to my academic work, I have remained active in the communication industry through my consulting work. In 2002, I consulted for

Input/Output Inc. and designed and implemented algorithms for optimizing the frequency selection process used by sonar for scanning the bottom of the ocean. In 2004, I worked with Allegiant Integrated Solutions in Ft. Worth, Texas to design and develop an integrated set of tools for fast deployment of wireless networks, using the 802.11 standard. Among other features, these tools optimize the placement of Access Points and determine their respective channel allocations to minimize interference and maximize capacity. I also assisted the Collin County Sheriff's Office (Texas) in a double homicide investigation, analyzing cellular record data to determine user location.

14. I have authored and co-authored over 100 journal publications, conference proceedings, technical papers, book chapters, and technical presentations in a broad array of communications-related technologies, including networking and wireless communication. I have also developed and taught over 100 courses related to communications and computer systems, including several courses on signals and systems, 4G/LTE and 5G/NR, OFDM, VoIP, Wi-Fi (802.11), 802.15.4, Zigbee, wireless communication, antenna design and beamforming, communications systems, communication interfaces and standards, channel estimation, location management, sensor networks, source coding and compression, network security, computer systems design, game and app design, and computer architecture. These courses have included introductory courses on communication networks and signals

and systems, as well as more advanced courses on wireless communications. A complete list of my publications and the courses I have developed and/or taught is also contained in my *curriculum vitae*.

15. My professional affiliations include services in various professional organizations and serving as a reviewer for a number of technical publications, journals, and conferences. I have also received a number of awards and recognitions, including the IEEE Professionalism Award (2008), UNT College of Engineering Outstanding Teacher Award (2008), and Tech Titan of the Future (2010) among others, which are listed in my *curriculum vitae*.

16. I have also served as an expert in certain legal proceedings. A list of cases in which I have testified at trial, hearing, or by deposition (including those during the past four years) is provided in my *curriculum vitae*. Over the years, I have been retained by both patent owners and petitioners, as well as plaintiffs and defendants.

17. I am being compensated for my work in this case at my standard rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter.

III. MATERIALS RELIED UPON IN FORMING MY OPINIONS

18. In preparing this Declaration, I have reviewed the ’105 Patent and its prosecution history, and the Petition for IPR for the ’105 Patent, including accompanying exhibits and the declaration of Dr. Bill Lin in support of the Petition. I have also reviewed the other documents and materials cited herein. When quoting from these materials, all emphasis is added unless otherwise noted.

19. My opinions are also based upon my education, training, research, knowledge, and personal and professional experience.

IV. LEGAL STANDARDS FOR PATENTABILITY

20. I am not an attorney and I offer no opinion on the law itself. My understanding of the relevant legal principles in this section is based on information provided to me by counsel.

A. Claim Construction

21. I understand that claim terms are typically given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art, at the time of the alleged invention, which I was asked to assume is the October 2013 timeframe. In considering the meaning of the claims, I also understand that one must consider the claim language, specification, prosecution history, and the knowledge of a person of ordinary skill in the art (“POSITA”) at the relevant time. I have followed these principles in my analysis.

22. I have been asked to apply the plain and ordinary meaning of the claim terms consistent with the specification.

B. Anticipation

23. I have been informed that a patent claim is invalid as "anticipated" if each and every limitation of the claim is described in a single publication or patent that predates the claimed invention. I understand that, in patent law, these prior publications or patents are called "prior art." I understand that in order to anticipate a claim, a prior art reference must do more than merely disclose each element of the claim, but rather the prior art reference must disclose all of the elements of the claimed invention arranged as is recited by the claim. I also understand that for a prior art reference to anticipate a claim of a patent, the reference must enable one of ordinary skill in the art at the time of the invention to practice the claim without undue experimentation.

24. I have been informed that a claim can be inherently anticipated if the prior art necessarily functions in accordance with or includes the claim limitations. I understand that inherency cannot be established by mere probabilities or possibilities.

C. Obviousness

25. I have been informed by counsel that a claim may be invalid if the invention recited in the claim would have been obvious to one of ordinary skill in

the art at the time the invention was made in light of the prior art. I understand for a claim to be found obvious, every claim limitation must be found present in the combination of the prior art references before the obviousness analysis proceeds.

26. In considering whether a claim is obvious, I understand that one must consider (a) the level of skill in the art at the time of the claimed invention, (b) the scope and content of the prior art, (c) any differences between the prior art and the claims of the patent-in-suit, and (d) any "secondary factors" tending to show non-obviousness of the claimed invention, including commercial success, long-felt but unresolved need, failure of others, copying, praise by others, unexpected results, and simultaneous invention by others.

27. I understand that a claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. I also understand that obviousness should not be analyzed using the benefit of hindsight. Instead, it must be analyzed from the standpoint of what was known and understood by a POSITA at the time of the claimed invention. I further understand demonstrating whether making a modification to a reference or whether combining multiple references would have been obvious requires providing a reason for why a POSITA would modify the reference or combine multiple references, and that reason must be supported with some rationale underpinning. Merely pointing out that two references are similar or in the same field of endeavor is not sufficient.

28. I understand that if a combination of two or more prior art references is used to render a claimed invention obvious, there must be a reasonable expectation of success in making or practicing the claimed invention based on such combination. I understand the combination cannot modify a prior art reference such that it would render the reference unsatisfactory for its intended purpose.

29. I understand that it is impermissible to use the patent as a template (and reason) for combining prior art references as that would be applying hindsight. I understand that a POSITA would have to be motivated to combine references to create the combination of features required by the claims of the patent.

V. LEVEL OF ORDINARY SKILL IN THE ART

30. In rendering the opinions set forth in this Declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art ("POSITA"). The "art" is the field of technology to which a patent is related. In my Declaration, I use the term POSITA and skilled person to refer to the same hypothetical person of ordinary skill in the art. I considered factors such as the educational level and years of experience of those working in the pertinent art; the types of problems encountered in the art; the teachings of the prior art; patents and publications of other persons or companies; and the sophistication of the technology. I understand that a POSITA is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

31. Relative to the ’105 Patent, a POSITA would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and two years of experience in the design or development of telecommunication systems. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education.

32. I understand that Petitioner has proposed the following set of qualifications: “an undergraduate degree in electrical engineering, computer engineering, computer science or a related field along with two years of work experience in the field of telecommunication. More education can supplement practical experience and vice versa.” Petition at 4-5. I am qualified to provide opinions concerning what a POSITA would have known and understood, and my analysis and conclusions herein are from the perspective of a POSITA and would apply under either set of qualifications.

VI. OVERVIEW OF THE ’105 PATENT

33. I have reviewed the ’105 Patent. It is my opinion that the ’105 Patent is patentable, valid, and not rendered obvious in view of the prior art references presented by Petitioner.

34. The ’105 Patent relates to “delivering telephone calls using the combination of a data channel and a voice channel.” Ex. 1001 at Abstract. The ’105

Patent states that it "permit[s] the same handset to be associated with multiple secondary telephone numbers from which calls appear to have been made and to which calls appear to have been placed." *Id.*

35. The specification describes both incoming calls (from a third-party) and outgoing calls (to a third-party). The claims of the '105 Patent, however, relate primarily to incoming calls, and I have therefore focused my analysis in this Declaration on that aspect of the '105 Patent specification.

36. The '105 Patent teaches that a handset may be associated with a primary number (such as the number assigned by a carrier at activation) and one or more secondary numbers:

> In connection with step 204, the server 100 may transmit information to the handset 340 via the data channel, which, through automatic operation of the handset application, permits the user to select one or more secondary telephone numbers to be referenced to a primary telephone number for the handset. The primary telephone number, preferably, may be a SIM number or ESN which is assigned to the handset 340 at the time of activation.

Ex. 1001 at 4:64-5:4.

37. The '105 Patent teaches that a bridge telephone number "may be associated with the switch 110, and calls to the bridge telephone number may be automatically routed to this switch." Ex. 1001 at 7:55-57.

38. The '105 Patent describes the process for receiving an incoming call and depicts that process in Figure 4, which I have excerpted below. In step 402

(highlighted in yellow), "[a]n incoming call to the secondary telephone number may be placed … by a calling party." Ex. 1001 at 5:55-57. In step 404 (highlighted in blue), the call is "routed over the PSTN 310 to the switch 110." *Id.* at 5:58-59. Switch 110 is "as associated telecommunications switch 110" for "server 100." *Id.* at 4:13-16. In step 406 (highlighted in green), the server looks up call processing rules and applies them. *Id.* at 5:60-6:31. If the call is allowed to proceed, according to the call processing rules, in step 408 (highlighted in pink), "the Call Manager 104 may transmit pre-call notification information to the handset 340, which includes the assigned/looked up bridge telephone number, via the data channel connection, i.e., over the Internet 316." *Id.* at 6:32-37. The handset can display certain information and call handling options to the user. *Id.* at 6:45-61. If the call is accepted, "the handset application may automatically cause the handset 340 to call the bridge telephone number in step 422 [highlighted in purple] over a voice channel." *Id.* at 6:62-65. Finally, in step 424 (highlighted in orange), once the switch receives the handset's call to the bridge telephone number, it can "bridge" the incoming call with the call from the third-party, thus connecting both ends of the call. *Id.* at 6:67-7:6.

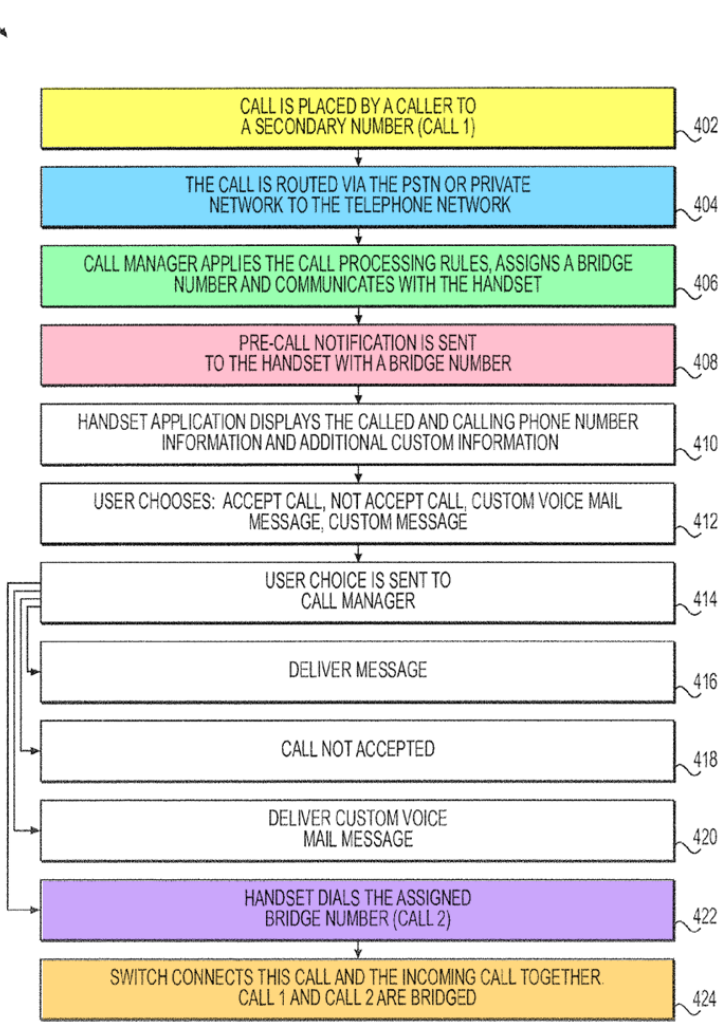


FIG. 4

VII. CLAIM CONSTRUCTION

A. "channel" terms

39. A POSITA would understand that a "channel" does not have to be fully connected on both ends to qualify as a channel. Additionally, a POSITA would understand that a channel does not have to be actually transmitting something to qualify as a channel at that moment.

40. The specification of the '105 Patent describes the use of data and voice

channels in its invention through numerous examples. Specifically, it repeatedly teaches that IP is an example data channel, and that channels such as CDMA, GSM, LTE, 3G, and/or 4G are example voice channels:

> The present invention relates to systems and methods for setting up and connecting telephone calls, and delivering information related to such telephone calls using an Internet Protocol (IP) or other data channel while delivering the voice portion of the call in accordance with CDMA, GSM or like voice channel delivery standards.

Ex. 1001 at 1:18-23.

> Responsive to the foregoing challenges, Applicant has developed an innovative method of providing telephone service by transmitting call handling information between a handset and a switch using an IP channel or similar protocol channel and by transmitting a voice call associated with the call handling information between the handset and the switch using a voice channel provided in accordance with a voice channel protocol, e.g., in accordance with CDMA or GSM, 3G, 4G, LTE or like future protocol channels standards.

Id. at 1:44-53.

> It should be noted that in connection with the described embodiments, reference is made to a data channel. A preferred data channel may be an Internet Protocol (IP) channel, which is not a conventional telephone voice channel.

Id. at 4:5-8.

> The communications between the server 100 and the handset 340 over the Internet 316 may utilize IP as a protocol opposed to protocols used to establish communications according to CDMA, GSM, or like standards. Such IP governed communications are referred to herein as being conducted over a "data channel." Conversely, communications between the switch 110 and the handset over the PSTN 310 may be transmitted and received in accordance with CDMA, GSM or like standards as opposed to using IP. Such CDMA, GSM or like governed

> communications, when used to carry voice information, are referred to herein as being conducted over a "voice channel."

Id. at 4:35-46.

41. The exemplary voice channels (CDMA, GSM, LTE, 3G, and/or 4G) are all conventional voice channels that a POSITA would be familiar with because they are used in conventional telephony.

42. The specification includes the following statement: "Such CDMA, GSM or like governed communications, when used to carry voice information, are referred to herein as being conducted over a 'voice channel.'" Ex. 1001 at 4:43-46. A POSITA would not understand the language "when used to carry voice information" to mean that a voice channel only qualifies as a channel when actually transmitting voice but not at other times (*e.g.*, when the phone is ringing, before the audio is connected). There is no teaching anywhere in the specification that would support such a temporal limitation, and it is not consistent with how POSITAs describe channels and protocols.

43. In fact, later teachings in the specification expressly contradict that that the "when" language imposes any such temporal requirement. Specifically, the patent describes that in an incoming call, there are two pending calls at the switch on a "voice channel" ***before*** they are bridged together to connect both ends. The specification consistently and repeatedly describes the calls as using a "voice channel" before they are connected (highlighted in blue below) and, afterwards, they

are connected (highlighted in red below)

> If the call is accepted in step 414, however, the handset application may automatically cause the handset 340 to call the bridge telephone number in step 422 ***over a voice channel***. The return call from the handset 340 to the bridge telephone number may be routed over the PSTN 310 to the switch 110 ***using a voice channel*** connection. In step 424, once the call to the bridge telephone number is received at the switch 110, the switch may "bridge" the ***incoming voice channel call*** to the bridge telephone number with the ***incoming voice channel call*** to the secondary telephone number to thereby ***connect the incoming call from the calling party to the handset 340 via a voice channel***.

Ex. 1001 at 6:62-7:6.

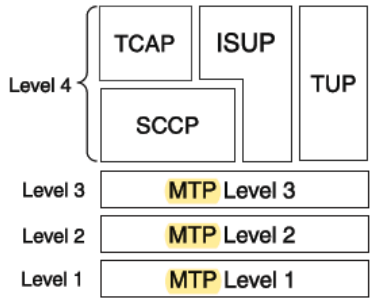
44. A POSITA would understand the scenario described above, where call legs are pending at the switch is substantially similar to a conventional phone call between two cell phones when the first person places the call, and it is ringing. In such a circumstance, there is a pending call leg because the call has not been accepted yet (because the second person has not answered the phone yet), but a POSITA would, consistent with the specification, still understand the call to be occurring on a "voice channel" because it will be transmitted according to a typical voice channel such as CDMA, GSM, LTE, 3G, and/or 4G (or a similar newer protocol, such as 5G).

45. Thus, a POSITA would understand the "when used to carry voice information" phrase in the specification relates to the fact that protocols like CDMA, GSM, LTE, 3G, and/or 4G can also be used to transport data protocols. For example, when accessing the Internet over a cellphone, a POSITA would know that the

communication would use IP traffic that is transported over a standard cellular protocol such as CDMA, GSM, LTE, 3G, and/or 4G. In such a situation, a POSITA would look to the protocol that is actually set to transmit information (in this case, IP), and not the protocol that is used merely for transport over wires or air waves (in this case, one of the cellular protocols). By contrast, in a voice call, the cellular protocol is actually set to be used to transmit information (the voices of the call participants) and would qualify as a voice channel. Thus, a POSITA would understand that "when used to carry voice information" is distinguishing between circumstances where the voice protocol is set to be used to transmit voice information rather than where the voice protocol is merely used to transport another protocol.

46. I have reviewed Petitioner's exhibits, and the reference describing the SS7 protocol (Ex. 1011) provides support for my opinion. That reference teaches that SS7 can be transported over an "MTP protocol" which is "SS7's native means of packet transport," or, in newer scenarios, "over IP."

Figure 4-18 *Introductory SS7 Protocol Stack*



Such a stack uses TDM for transport. This book focuses on traditional SS7 because that is what is implemented. Newer implementations are beginning to appear that use different transport means such as IP and that have associated new protocols to deal with the revised transport.

The SS7 physical layer is called MTP level 1 (MTP1), the data link layer is called MTP level 2 (MTP2), and the network layer is called MTP level 3 (MTP3). Collectively they are called the *Message Transfer Part (MTP)*. The MTP protocol is SS7's native means of packet transport. In recent years there has been an interest in the facility to transport SS7 signaling over IP instead of using SS7's native MTP. This effort has largely been carried out by the Internet Engineering Task Force (IETF) SigTran (Signaling Transport) working group. The protocols derived by the SigTran working group so far are outside the scope of this introductory chapter on SS7. However, full details of SigTran can be found in Chapter 14, "SS7 in the Converged World."

Ex. 1011 at 83. This is consistent with how a POSITA would understand "channels": the focus is not on the underlying protocol(s) used for transport, but on the protocol that is being used to transmit information (whether that information is voice or data, or any other type of information).

47. I disagree with the following statement that appears in the Petition:

> A POSITA would have understood the encoded message ("pre-call information") is transmitted via a "data channel" because Backhaus discloses that a voice path is not connected until the call is answered by the callee.

Petition at 33. This statement reflects an understanding of the term "channel" that is inconsistent with the '105 Patent and how a POSITA would understand that term.

Specifically, this statement is inconsistent with the patent's teaching that I described above, which expressly and repeatedly describes call legs as occurring on a "voice channel" before the two call legs are bridged together (which is when the voice path would be connected). Ex. 1001 at 6:62-7:6. Further, as I explained above, a POSITA would understand that the fact that "a voice path is not connected" does not define whether or not a voice channel is being used. A POSITA would understand a conventional call to be using a voice channel when ringing (*i.e.*, before the "voice path" is connected, which only happens when the callee picks up the phone).

48. Thus, for all the reasons I described above, POSITA would understand that a "channel" does not have to be fully connected on both ends to qualify as a channel. Additionally, a POSITA would understand that a channel does not have to be actually transmitting something to qualify as a channel at that moment.

B. "transmitting pre-call information …" (limitation [1.g]) / "transmitting … pre-call information …" (limitation [2.a])

49. Both independent claims of the '105 Patent recites a limitation of transmitting "pre-call information" as follows:

> [1.g] transmitting pre-call information via a data channel to the handset under the control of the server, said pre-call information including a bridge telephone number for connecting the handset to the incoming call at the switch
>
> [2.b] transmitting, from the server to the telephone handset via at least one data channel, pre-call information including the first bridge telephone number, whereby the pre-call information allows the telephone handset to accept the incoming call to the secondary

telephone number by making a first bridge call using the first bridge telephone number to connect the incoming call to the telephone handset via the switch

Ex. 1001 at cls. [1.g] and [2.b].

50. A POSITA would understand that the "pre-call information" is transmitted after receiving a call (steps [1.d] and [2.a]) and relates to that specific call that has been received.

51. The plain claim language makes clear to a POSITA that the pre-call information is transmitted after receiving the call by reciting that the pre-call information including information relating to "the incoming call," which refers back to the claim term "an incoming call" introduced in limitations [1.d] and [2.a]:

Claim 1	Claim 2
[1.d] receiving an electronic indication of ***an*** ***incoming call*** to the secondary telephone number at the server, said electronic indication of an incoming call being received from a switch associated with the server;	[2.a] in response to ***an*** ***incoming call*** to the secondary telephone number received by a switch, retrieving, by a server from a database, a first bridge telephone number to be used for completion of the incoming call to the secondary telephone number, wherein the first bridge telephone number is associated with the switch such that calls to the first bridge telephone number are automatically routed to the switch; and

Claim 1	Claim 2
[1.g] transmitting pre-call information via a data channel to the handset under the control of the server, said pre-call information including a bridge telephone number for connecting the handset to ***the*** ***incoming call at the switch***	[2.b] transmitting, from the server to the telephone handset via at least one data channel, pre-call information including the first bridge telephone number, whereby the pre-call information allows the telephone handset to accept ***the*** ***incoming call to the secondary telephone number*** by making a first bridge call using the first bridge telephone number to connect ***the*** ***incoming call*** to the telephone handset via the switch

52. Thus, a POSITA would understand the claim language imposes a logical and temporal relationship between the incoming call and the pre-call information, namely that the pre-call information is transmitted after and relates to the specific call received in steps [1.d] and [2.a].

53. The specification is also consistent with this understanding. As I described above, the specification teaches that a call is received in step 404 (highlighted in blue below). Ex. 1001 at 5:58-59. After receiving the call, the server transmits pre-call information in step 408 (highlighted in pink). *Id.* at 6:32-37. The pre-call information relates to the specific incoming call because it includes a bridge telephone number that can be dialed by the handset to connect to the previously-received incoming call. *Id.* at 6:32-37, 6:62-7:6. These teachings, as well as the flow depicted in Figure 4, clearly indicate to a POSITA that the pre-call information is transmitted after receiving an incoming call and relates to that specific call.

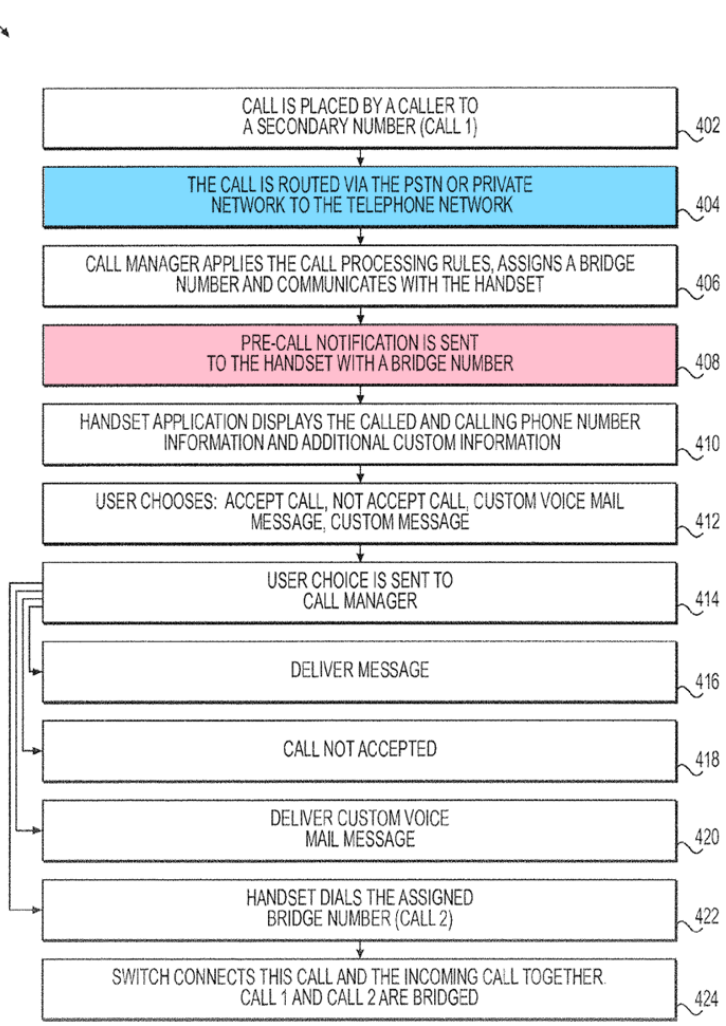


FIG. 4

54. A POSITA would therefore understand that the "pre-call information" is transmitted after receiving a call (steps [1.d] and [2.a]) and relates to that specific call that has been received.

C. "a bridge telephone number for connecting the handset to the incoming call at the switch" (limitation [1.g])

55. Limitation [1.g] of the '105 Patent recites as follows:

> [1.g] transmitting pre-call information via a data channel to the handset under the control of the server, said pre-call information including a

> bridge telephone number for connecting the handset to the incoming call at the switch

Ex. 1001 at cl. [1.g].

56. In addition to the timing and logical relationship for claim limitation [1.g] that I described above, a POSITA would also understand that the bridge telephone number is for use ***by the handset*** to connect to the incoming call recited in limitation [1.d].

57. The plain claim language makes this clear by indicating that the pre-call information is transmitted to "the handset" and is for connecting ***the handset*** to the incoming call at the switch." Thus, a POSITA would understand the bridge telephone number is for use by the handset to connect the call (not, for example, the server).

58. The surrounding claim language in limitation [1.i] provides further support by reciting "***the handset*** calling the switch using the bridge telephone number." Limitation [1.i] is optional (because of the "or" preceding it, only one of limitations [1.h] and [1.i] need to be performed), but this claim language is still consistent with a POSITA's understanding that the bridge telephone number is for use by the handset.

59. The specification is also consistent with this understanding. It teaches that it is the handset that uses the bridge telephone number in step 422 (highlighted in purple) by "call[ing] the bridge telephone number … over a voice channel." Ex.

1001 at 6:62-65.

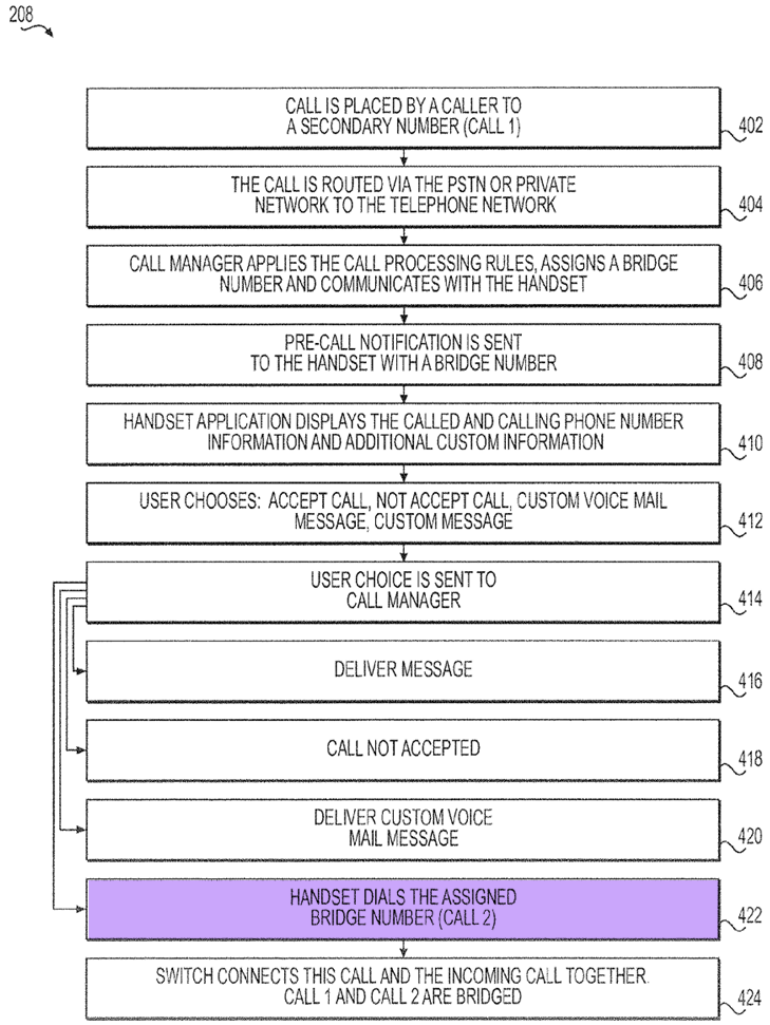


FIG. 4

60. A POSITA would therefore understand that the bridge telephone number is for use ***by the handset*** to connect to the incoming call recited in limitation [1.d].

VIII. OVERVIEW OF THE CITED PRIOR ART

61. Here, I provide very brief overviews of the prior art references relied on in the Petition. I discuss these references in more detail in connection with the

claim limitations below.

A. Backhaus (Ex. 1005)

62. Backhaus describes routing calls through what it calls a "second line service ('SLS')":

> A method for routing calls between a third party telecommunications device ("TD") and a subscriber TD associated with a primary service and a second line service ("SLS") involves associating the SLS number of the subscriber, the primary number of the subscriber and the primary number of a third party via a common relationship number. Calls directed from a third party to the SLS number of a subscriber are routed to an SLS platform and redirected to the subscriber TD. Calls directed from the subscriber TD to the third party use the relationship number to route the call to the SLS platform. The combination of the primary service number and the relationship number identifies the third party number for call completion. Calls can be directed to and from an SLS number of a subscriber TD using a combination of protocols such as ISUP, CAP and SIP.

Ex. 1005 at Abstract.

63. Backhaus teaches the use of a server—"SLS platform 115"—for processing calls. Ex. 1005 at [0034]. Backhaus does not reference switches at all but does state that calls can be routed via the PSTN. *E.g.*, *id.* at [0032], [0136].

64. Backhaus does not share the '105 Patent's focus on using both voice channels and data channels in relation to a single call. Backhaus does reference data protocols such as "IP" (*e.g.*, *id.* at [0073]), but never describes using both IP and a voice channel for a single call.

65. Backhaus' process for connecting incoming calls is to have the SLS

platform create the second leg of the call by placing a call to the subscriber's device:

> [0054] Returning to the example, now that the relationship number 1.678.222.0001 has been established in connection with subscriber #1 and the calling third party, the SLS platform 115 may proceed to establish the second half of the call—the call from the SLS platform 115 to the subscriber's TD 110. The SLS platform 115 places the call to the primary number 1.408.544.1212 that points to subscriber TD 110 per its primary service provider 201.

Ex. 1005 at [0054].

B. Taylor (Ex. 1007)

66. The Petition appears to rely on Taylor primarily in relation to its depiction of prior art systems in Figure 1A. That Figure depicts, as a POSITA would already know, that the PSTN includes multiple switches (circles numbered 12 and highlighted in yellow below):

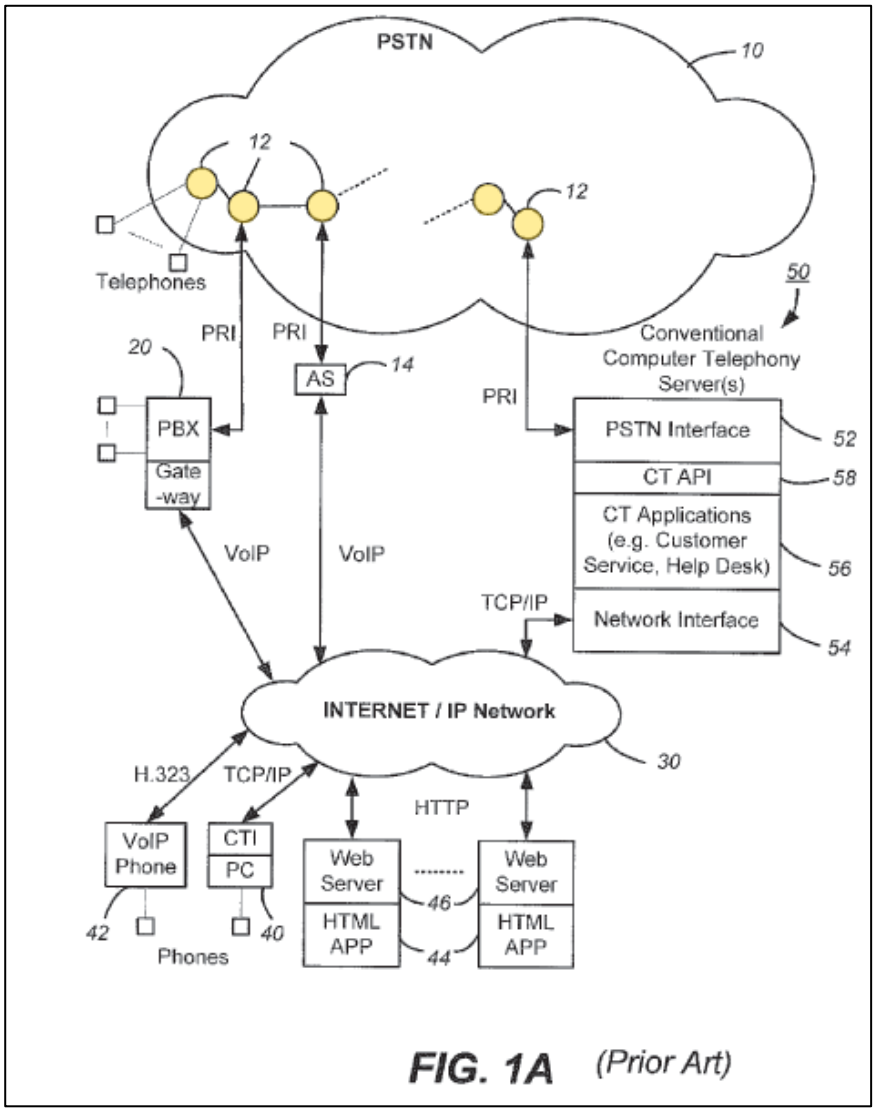


FIG. 1A (Prior Art)

Ex. 1007 at Fig. 1A, [0004] (identifying "switches 12").

C. Logan (Ex. 1015)

67. The Petition relies on Logan for various call processing rules and/or services such as voicemail. Logan describes applying such processing and rules to calls to a virtual number:

> [0026] According to an illustrative embodiment of the system, ***calls dialed to the virtual phone numbers*** are transmitted to a network 120, for virtual number 101 via data stream 111, for virtual number 102 via

> data stream 112, and for virtual number 103 via data stream 1 13. These incoming calls are all forwarded through the network 120 via data stream 125 to a system server 130 and then forwarded to the user's cellphone—but only when that user is in the appropriate location, or meets other user-specified preferences.
>
> …
>
> [0028] The system server 130 is responsible for determining which calls a user desires to receive. Accordingly, the server employs a forwarding application 132 to determine if it is a desired call. The forwarding application determines ***which virtual number was dialed*** by the calling party and then determines if the preferences set up by the called party indicate whether the call should be forwarded to the user.

Ex. 1015 at [0026] and [0028].

D. Winbladh (Ex. 1020)

68. Winbladh describes a process for routing calls from a first terminal to a second terminal that involves using particular telephone numbers:

> A telephone connection is established between a first terminal (A) and a second terminal (B). The first terminal (A) is presumed to be associated with a subscription in a first home telephone network (α) in which the terminal (A) is identified by means of a first network identity (CLIA). Correspondingly, the second terminal (B) is presumed to be associated with a subscription in a second home telephone network (β) in which the second terminal (B) is identified by means of a second network identity (CLIB). According to the invention, a host resource (110) routes a call from the first terminal (A) to the second terminal (B) based on a combination of the first network identity (CLIA) and a first common telephone number (#n) in the first home telephone network ( ) dialed by the first terminal (A). This is rendered possible because the first common telephone number (#αn) is selected such that the first is combination unique. However, the first common telephone number (#αn), as such, is adapted to be shared among a group of users in the first home telephone network.

Ex. 1020 at Abstract.

69. Winbladh teaches a process where the second user initially accepts a call, then disconnects, and then uses a special telephone number within a certain period of time to reconnect to the call:

> [0056] In FIG. 4, we assume that a two-legged L1, L2 bi-directional primary connection has been set up between the first terminal A and the second terminal B. According to one preferred embodiment of the invention, as soon as such a connection exists, the terminal B may disconnect the second leg L2, reconnect to the host resource 110 at a local-call rate, and reestablish the connection with the terminal A.
>
> [0057] To this aim, the host resource 110 is specifically adapted to receive a termination request from the second terminal B after having set up the bi-directional primary connection L1, L2 between the terminals A and B. In response to such a request, the host resource 110 is further adapted to disconnect the second leg L2 while maintaining the first leg L1 during a threshold period T after having disconnected the second leg L2.
>
> [0058] If a return call to a predefined telephone number # β r is received from the second terminal B before expiry of the threshold period T, the host resource 110 is adapted to set up a new second leg L2′ and associate this leg with the first leg L1, such that a bi-directional secondary connection L1, L2′ is established between the first terminal A and the second terminal B. Naturally, a precondition for this type of secondary connection L1, L2′ is that no termination request has yet been received from the terminal A.

Ex. 1020 at [0056]-[0058].

70. A POSITA therefore would understand that Winbladh's system would not just work with normal telephone calls transmitted over the public telephone network. Instead, Winbladh would have to control the routing of calls. Winbladh would also have to control the calls so that they could be maintained even after the

recipient's initial disconnect signal. And Winbladh would have to provide for some sort of backhaul to link the reconnect call to the original call. A POSITA would therefore understand that Winbladh's system is very different and would effectively replace the public telephone networks.

IX. GROUND 1

A. Backhaus and Logan do not render obvious limitation [1.g]'s requirement to transmit "pre-call information" via a "data channel."

71. Limitation [1.g] recites as follows:

> [1.g] transmitting pre-call information via a data channel to the handset under the control of the server, said pre-call information including a bridge telephone number for connecting the handset to the incoming call at the switch; and

Ex. 1001 at cl. [1.g].

1. Backhaus and Logan do not render obvious that the pre-call information includes a bridge telephone number "for connecting the handset to the incoming call at the switch."

72. As I explained above, a POSITA would understand this claim language to mean that the bridge telephone number is for use ***by the handset*** to connect to the incoming call recited in limitation [1.d].

73. The Petition addresses this limitation by arguing "SLS platform 115 then calls subscriber's TD 110 *using the relationship number* for connecting the incoming call." Petition at 36 (citing Ex. 1005 at [0052]-[0055]). But, as I explained above, a POSITA would understand the relationship number is to be used ***by the***

handset, not the server. As such, even if the SLS platform uses the relationship number, that does not render this claim limitation obvious.

74. Additionally, I disagree that the SLS platform "uses" the relationship number "for connecting the incoming call." Backhaus teaches that the SLS platform "places the call to the primary number." Ex. 1005 at [0054]. The relationship number may be provided in the "calling party field of the call." *Id.* at [0055]. A POSITA would not consider providing a caller ID to be "using" the caller ID "for connecting the incoming call." The caller ID is not "used" to connect the call—it plays no role in routing the call or connecting the two ends of the call. Thus, a POSITA would not agree that even the SLS platform uses the relationship number "for connecting the handset to the incoming call at the switch."

2. The Petition's "first way" fails to disclose transmitting "via a data channel."

75. The Petition's first way relies on Backhaus transmitting the relationship number in the "calling party field of the call" when a third-party makes a call to the subscriber:

> With "the relationship number…ha[ving] been established in connection with subscriber #1 and the calling third party, the SLS platform 115 may proceed to establish the second half of the call—the call from the SLS platform 115 to the subscriber's TD 110" by "plac[ing] the call to the primary number…that points to subscriber TD 110…." (Ex. 1005, [0054].) Backhaus discloses the "**calling party field of the call placed from SLS platform 115 to subscriber TD 110** may contain **a specially encoded message for the SLS phone app running on SLS module 105** [of TD 110]," "**contain[ing] the**

> **relationship number established by the SLS platform 115**…and the actual primary number of the calling third party." (*Id.*, [0055]; *see also id.*, [0010], [0064].)

Petition at 32-33.

76. A POSITA would understand that the "calling party field of the call" is delivered as part "of the call" (as Backhaus teaches), and thus is transmitted on the same voice channel as the call itself, which may be some channel like CDMA, GSM, LTE, 3G, or 4G. Indeed, a POSITA would understand this teaching in Backhaus to be referring to conventional caller ID, where Backhaus describes replacing the actual calling number in the caller ID with the relationship number (possibly with some additional information) so that it will "trigger recognition of the incoming call as a call directed to the SLS number of the subscriber." Ex. 1005 at [0055].

77. A POSITA would be familiar with caller ID, which was well understood in telephony prior to the 2013 timeframe of the '105 Patent. A POSITA would understand that caller ID is delivered over the same channel as the call itself, either over the PSTN or some wireless protocol such as CDMA, GSM, LTE, 3G, or 4G. Thus, a POSITA would understand caller ID to be provided over the same voice channel that the call is being made on.

78. The Petition next alleges the following:

> A POSITA would have understood the encoded message ("pre-call information") is transmitted via a "data channel" because Backhaus discloses that a voice path is not connected until the call is answered by the callee.

Petition at 33. As I discussed above, this statement is inconsistent with how a POSITA would understand the term "channel." A POSITA would understand that a call still uses a "voice channel" while it is ringing before the call is answered and connected on both ends.

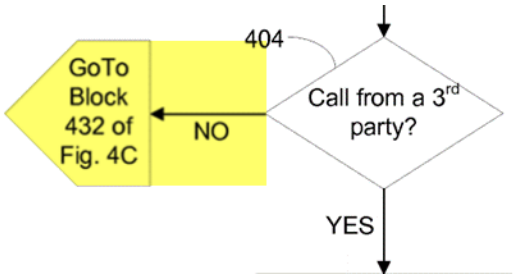
79. The Petition next discusses Backhaus paragraph [0073]. Petition at 33-34.

80. To understand Backhaus paragraph [0073], however, you must understand Backhaus' entire disclosure relating to Figures 4A-4D. Backhaus teaches that "FIGS. 4A-4D collectively illustrate an exemplary method 400 for routing calls between a third party telecommunications device, such as third party TD 120, and a telecommunications device associated with a subscriber to a second line service, such as subscriber device 110." Ex. 1005 at [0062].

81. The disclosure in paragraphs [0071]-[0074] relates to Figure 4D. Figure 4D is only reachable "if the 'no' branch is followed from block 432 of Fig. 4C." Ex. 1005 at [0071]. Figure 4C is only reachable "if the 'no' branch is followed from block 404 of Fig. 4A." *Id.* at [0069].

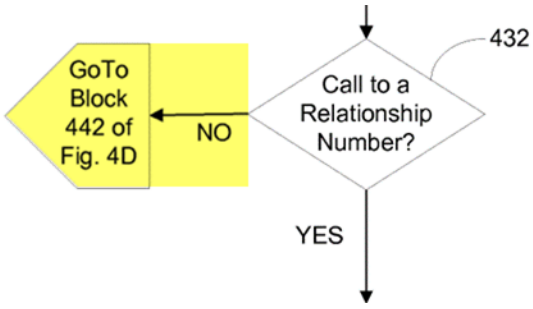
82. Block 404 of Figure 4A, excerpted below, is a determination "whether the communication was a call that originated from a third party seeking to connect to a subscriber's device, i.e. whether a third party has dialed an SLS number associated with an active subscriber to the SLS service provided by SLS platform

115." Ex. 1005 at [0062]. Thus, following the "no" branch of block 404 means the communication to the SLS platform is not a call from a third party to the subscriber.



Ex. 1005 at Fig. 4A.

83. Block 432 of Figure 4C, excerpted below is a determination "that the communication is a call that was directed to a relationship number." Ex. 1005 at [0069]. Thus, following the "no" branch of block 432 means the communication to the SLS platform is not a call to a relationship number.



Ex. 1005 at Fig. 4C

84. Thus, the only way to get to Figure 4D is to determine that the communication to the SLS platform is not a call from a third party to a subscriber and also is not a call to a relationship number. A POSITA would therefore understand that the teachings in paragraphs [0071]-[0074] relating to Figure 4D are unrelated to either an incoming or outgoing call. This is consistent with Backhaus'

express teaching that Figure 4D involves a determination "that the communication is a data communication over network 125 that originated from an SLS client of a subscriber TD." Ex. 1005 at [0071]. This is also consistent with Backhaus' disclosure as a whole: Backhaus never describes using both a data protocol and voice protocol in connection with a single call. The discussion of using IP in paragraph [0073] is only after determining that there is no call (in either direction).

85. Accordingly, a POSITA would not rely on paragraph [0073] in connection with the Petition's proposed first way, because the first way involves an incoming call from a third party but paragraph [0073] relates to Figure 4D which is only reachable if you have determined there is ***not*** an incoming call from a third party.

86. These are distinct processing paths in Backhaus that are only reachable with distinct types of communications. A POSITA would understand you cannot mix and match elements from different processing paths, because that is not consistent with the teachings of Backhaus, and the Petition provides no reason why doing so would have been obvious.

87. The Petition further contends that a POSITA would have found it obvious to use IP allegedly because it minimizes delays:

> Additionally, Backhaus explains that the IP-based communication "minimize[s] temporal delays in allocating and acquiring relationship numbers between an SLS module 105 and an SLS platform 115." (*Id.*) Thus, a POSITA would have found it beneficial to implement this

> feature. A POSITA would have had the skill in implementing, and expectation of success in achieving, the above implementation as Backhaus already use IP-based communications for transmitting data between TD 110 and SLS platform 115. (Ex. 1005 at claim 15, [0029], [0032], [0073].)

Petition at 33-34.

88. I disagree that a POSITA would have found this obvious. The Petition offers no reason why a POSITA would replace Backhaus' already-disclosed method of providing the relationship number (in the calling party field of the call) with another.

89. Moreover, the delay argument would not be convincing to a POSITA. A POSITA would understand Backhaus' method of using the "calling party field of the call" (Ex. 1005 at [0055]) means that the call and relationship number are transmitted together and would arrive together at the same time. If the relationship number were split into a separate transmissions and transmitted faster than the call itself, as the Petition appears to suggest, then the relationship number could arrive before the call. In this case, the handset would have a notification relating to a call that is not ready to accept, which would be a bad experience for the user because the user would be able to see the incoming call notification but would be unable to accept it. Or, if the incoming call notification were held back until the call is received, then there was no reason to separate them in the first place. Additionally, even if IP can sometimes reduce delays, a POSITA would understand it may not always do so (*e.g.*,

if the network is congested, or if particular internet service providers and/or transmission lines are not working due to weather). Thus, separating the transmissions would allow for the possibility that the relationship number arrives after the call, which means the handset would be receiving an incoming call without having the relationship number to display to the user (or to use to indicate to the user that the call is one made to the secondary number). This would be a bad experience for the user as well because the user would have to accept or reject a call without having all information about that call. Thus, a POSITA would not be motivated to separate the transmission of the relationship number from the call itself, because that would provide no benefits and instead could lead to bad experience for the users.

3. The Petition's "second way" fails to disclose transmitting "via a data channel."

90. The Petition's second way contends Backhaus provides a relationship number when a subscriber wants to call a third party with no relationship number previously assigned. Petition at 34 (citing Ex. 1005 at [0071]-[0074]).

91. Backhaus states the "determined next available relationship number is returned" in paragraph [0074], but never states what channel or protocol is used to make this transmission.

92. Backhaus teaches that channels such as "cellular data, WiFi, Bluetooth technologies, proprietary wireless or wired technologies … can be used in … sharing information between the SLS module 105 and the SLS platform 115." Ex. 1005 at

[0073]. A POSITA would not understand this teaching to mean that the relationship number specifically is transmitted by a data protocol. All a POSITA would understand from this paragraph is that ***some*** communications between the handset and SLS platform involve a data protocol. It could be other information besides the relationship number that is transmitted by IP, such as the user's account setup, any login credentials (*e.g.*, username/password), and/or the initial registration for a secondary (SLS) number. But Backhaus does not state that every communication occurs via a data protocol and does not identify any specific communication that occurs via a data protocol, so a POSITA would not conclude that the relationship number specifically is transmitted by a data protocol.

4. The Petition's "second way" fails to render obvious "transmitting pre-call information …" as properly construed.

93. As I explained above, a POSITA would understand that the "pre-call information" is transmitted after receiving the call in limitation [1.d] and relates to that specific call that has been received in limitation [1.d].

94. The Petition's second way contends Backhaus provides a relationship number when a subscriber wants to call a third party with no relationship number previously assigned. Petition at 34 (citing Ex. 1005 at [0071]-[0074]).

95. This theory does not relate to any incoming call, and certainly not the specific incoming call that the Petition relies on for limitation [1.d].

96. The fact that the same relationship number may be used in a later

incoming phone call does not change my analysis. A POSITA would not understand the information exchanged when a user wants to make an outgoing call to relate to a specific, already-received incoming call (even if the relationship numbers for both cases happen to be the same). The timing and logical relationship in Backhaus simply does not match that of the claims, and therefore this limitation is not obvious.

B. Backhaus and Logan do not render obvious limitation [1.b]'s storing information indicating "a selection of call processing rules for the primary telephone number" in a computer memory associated with the server.

97. Limitation [1.b] recites as follows:

> [1.b] automatically storing electronic information that indicates a selection of call processing rules for the primary telephone number in the computer memory;

Ex. 1001 at cl. [1.b].

98. The phrase "the computer memory" refers back to limitation [1.a], which recites "a computer memory associated with a server." Thus, limitation [1.b] requires storing information indicating a selection of call processing rules for the primary number in the computer memory.

99. Backhaus does not disclose storing primary call processing rules at a server memory. The only reference to services for the primary number is in paragraph [0068], where Backhaus states that any services it provides are "separate from" any services provided for the primary number:

> [0068] At block 428 the subscriber is alerted to the incoming call and at block 430 the call is connected to the subscriber TD 110 by the SLS platform 115 when the subscriber answers the call. It is envisioned that, if the subscriber elects not to answer a call to the SLS number, the SLS module 105 in some embodiments may use a voicemail service or message service in response to the unanswered call. That is, it is envisioned that an SLS service may provide features and services dedicated to the SLS subscriber and ***separate from*** similar features and services associated with the subscriber's primary number.

Ex. 1005 at [0068].

100. A POSITA would understand the above teaching to only mean that Backhaus provides services for the secondary number, and that those services are separate from any services that may be associated with the primary number. A POSITA would not understand the above to describe Backhaus providing primary number services, much less storing information relating to primary call processing at a server memory.

101. Logan likewise does not teach storing rules for processing a call to a primary number at any server memory.

102. The Petition argues that "Logan discloses MNC 140 receives calls towards multiple numbers associated with the device (*e.g.*, a base number and virtual numbers)." Petition at 14 (citing Ex. 1015 at [0011] and [0021]). But a POSITA would understand Logan to teach merely that MNC 140, which is the user's cellphone, receives calls to both numbers. Neither paragraphs [0011] nor [0021] describe storing call processing rules for a primary number at a server memory.

103. The Petition cites to voicemail and other rules, which it claims are transmitted to the server in paragraph [0029] (Petition at 14-15), but in the immediately preceding paragraphs, Logan teaches that those are rules for calls to the virtual phone numbers:

> [0026] According to an illustrative embodiment of the system, ***calls dialed to the virtual phone numbers*** are transmitted to a network 120, for virtual number 101 via data stream 111, for virtual number 102 via data stream 112, and for virtual number 103 via data stream 1 13. These incoming calls are all forwarded through the network 120 via data stream 125 to a system server 130 and then forwarded to the user's cellphone—but only when that user is in the appropriate location, or meets other user-specified preferences.
>
> [0027] In an illustrative embodiment, if the GPS-enabled MNC phone indicates to the server that the user is at the office, ***the virtual phone number*** forwards any calls coming to the virtual office number to the user's cellphone. The same applies for a virtual home number. If the user is not at the appropriate location, then the call is not forwarded and goes into the voicemail database. In this manner, the distraction of receiving home phone calls at the office on one's cellphone, or business-related calls when not in the office would be eliminated.
>
> [0028] The system server 130 is responsible for determining which calls a user desires to receive. Accordingly, the server employs a forwarding application 132 to determine if it is a desired call. The forwarding application determines ***which virtual number was dialed*** by the calling party and then determines if the preferences set up by the called party indicate whether the call should be forwarded to the user.

Ex. 1015 at [0026]-[0028].

104. None of the other paragraphs cited in the Petition teach storing rules at a server for processing calls to a primary number. The following paragraphs do not describe storing rules at a server memory at all:

[0005] While the home and office landline numbers serve to channel calls to the correct locations, such users might also wish to consolidate their phone usage to just a cellphone and dispense with the use of landlines. This presumes that their cellphone reception is adequate at both locations or that their cellphone can make use of wireless Internet/network connectivity (WiFi), or other alternative networks when reception is poor. Rendering a cellphone as their sole phone can be desirable for cost reasons, the ability to receive all voicemails in one location, or to always maintain ready access to the higher-technology features offered by cellphones.

[0011] This invention overcomes disadvantages of the prior art by providing a system and method for call forwarding, employing virtual phone numbers associated with landline and other discrete telephone units, in which a cellular telephone user, based upon his or her unique user preferences, can control the forwarding of calls from the caller to a series of virtual numbers, as well as the users cellular telephone "base" or owned number (i.e. the number that is the user cellular telephone-specific number). The forwarding of calls to the owned number and virtual numbers can be based on a variety of factors. In an illustrative embodiment, the forwarding factors can include the location of the cellular telephone, determined by GPS, triangulation or another mechanism, or the time of day. In this manner, the user can designate a virtual number as a home number, an office number, and a traveling number. Calls are received at each number when the user cellular telephone is located at the predetermined location, or it is the predetermined time of day. When calls are received to one of the virtual numbers, or to the base number, outside of the permitted receipt time, as provided by the user preferences, the call is routed to a voicemail database by the system server, which implements a call forwarding application.

[0043] This is highly desirable, for example, for a person who works from home, but still desires to have a distinct home phone number and business phone number, and only desires to receive business-related phone calls from, for example, 8 am to 5 pm, Monday through Friday.

[0046] In another variant of bending the geo-based rules for an MNC, a user might allow certain callers to always get through regardless of where the MNC user was, or to get through if the MNC user was or wasn't in certain locations. Thus, a very important customer, identified

> via caller ID or other means such as answering a question posed by the server might be routed to the MNC no matter the location or if the user was in any of a number of specified locations. Such an arrangement brings that customer one step closer to actually having the mobile number of the MNC user.
>
> [0055] Cellular phones can also be located using the Mobile Positioning System (MPS) as described in U.S. Pat. No. 6,799,048 issued to Wahlberg et al. on Sep. 28, 2004. In addition, hosted, server-based systems for handling incoming phone calls directed to telephone numbers assigned to subscribers in a manner specified by preferences submitted by the subscriber via a web interface are now in widespread use, and one such system is described in U.S. Pat. No. 6,445,694 issued to Robert Swartz on Sep. 3, 2002. Server-based systems for routing telephone calls to cellular phones based on their locations are described in U.S. Pat. No. 6,788,766 issued on Sep. 7, 2004 to James D. Logan and in U.S. Pat. No. 5.978,673 issued on Nov. 2, 1999 to Vladimir Alperovich. The disclosures of each of the foregoing four patents is incorporated herein by reference.

Ex. 1015 at [0005], [0011], [0043], [0046] and [0055].

105. Claim 2 of Logan depends from claim 1, which repeatedly makes clear that it relates to processing calls to a virtual number, not a primary number:

> 1. A system for forwarding telephone ***calls to virtual numbers*** associated with a user cellular telephone comprising:
>
> a system server, the user cellular telephone being interconnected by a network to the system server so as to send and receive telephone calls through the network;
>
> a forwarding application associated with the system server including information ***with respect to virtual phone numbers*** associated with the user cellular telephone, the forwarding application assigning user preferences ***to each of the virtual telephone numbers*** based upon at least one of a location of the user cellular telephone and a time-of-day; and

> a voicemail database operatively connected with the system server that stores messages from callers ***to each of the virtual telephone numbers*** when predetermined location or time-of-day information, in association with the user preferences requires that ***calls to the virtual number*** be stored as messages.
>
> 2. The system as set forth in claim 1 wherein the user preferences are provided through an interface including at least one of an internet-based application and a cellular telephone-based application.

Ex. 1015 at cls. 1-2.

106. Paragraph [0039] relates to calls to a virtual number, as is clear from both that paragraph and the preceding one:

> [0038] The illustrative system forwards calls from a calling party to a called party (of the called party's voicemail, depending on the user preferences), according to an exemplary call forwarding procedure 200, as shown in FIG. 2. As preciously described, a calling party dials ***one of a plurality of "virtual" numbers*** to contact a called party, as shown at step 210. The calling party dials ***the virtual number*** in the same manner as through he or she is unaware of the lack of a landline phone corresponding to ***the virtual number***. At procedure step 215, the incoming call is forwarded to a system server, which, according to this embodiment, handles all of the incoming calls for the system. As discussed herein, in alternate embodiments, the system may employ a plurality of preference- or location-specific servers, for handling ***the different virtual numbers*** according to the location and/or other preferences specified by the user corresponding to ***the virtual number***.
>
> [0039] The single system server of the illustrative procedure 200 employs a forwarding application at step 220, which determines if the incoming call is a desired call at step 230 by verifying the user-specified preferences. For example, a user can desire that when at location #1 (home), the MNC receives incoming ***calls directed at virtual #1*** ("home" phone number). When an incoming telephone call is transmitted to the system server, the forwarding application determines if the user is at location #1 (home), and if they are, then the application forwards the call to the MNC user at step 240. In the alternative, if the user is not at the location #1 (home), then it is not a desired call for the

> user, and the call is therefore forwarded to a voicemail database at procedure step 250.

Ex. 1015 at [0038]-[0039].

107. Thus, a POSITA would understand that nothing in Logan teaches storing call processing rules for a primary number at a server memory.

108. Therefore, a POSITA would not find limitation [1.b] obvious because neither Backhaus nor Logan discloses storing call processing rules for a primary number at a server memory, and the Petition does not identify any reason it would have been obvious to modify either reference to provide such a feature, particularly in light of Backhaus' acknowledgement that such features already exist for the primary number "separate from" Backhaus' system. *See* Ex. 1005 at [0068].

X. GROUND 2

A. A POSITA would not combine Backhaus and Winbladh

109. Backhaus clearly teaches that call routing is done through the conventional PSTN (or other conventional network such as a cellular network) for calls to both the primary and SLS numbers:

> [0032] In general, any call directed to either of the primary phone number or the SLS phone number are transmitted from a third party TD 120 to the subscriber TD 110 by way of communications network 125. Notably, communications network 125 envisions any and all networks for transmitting and terminating communications between telecommunications devices such as, but not limited to, cellular networks, PSTNs, cable networks and the Internet. …

Ex. 1005 at [0032].

110. Backhaus further teaches that these conventional phone networks route calls to the secondary number based on its phone number, just the same way that any other phone call is routed:

> [0034] Returning to the FIG. 1 illustration, a call made from a third party TD 120 to an SLS number associated with subscriber TD 110 is transmitted across network 125. As one of ordinary skill in the art will be aware, the network 125 recognizes where the call needs to be routed based on the called number (the SLS number associated with the subscriber) and routes the call to SLS platform 115. SLS platform 115 thus effectively intercepts the call, determines that the call was intended for subscriber TD 110 and then takes actions such that the call can be terminated at the subscriber TD 110. In this way, while a call directed to a primary number associated with subscriber TD 110 is routed directly to subscriber TD 110, a call directed to a second line number associated with subscriber TD 110 is routed to SLS platform 115 instead.

Ex. 1005 at [0034].

111. Backhaus also contains multiple teachings that it is directed to providing cross-carrier functionality and to working without coordinating with the subscriber's primary serv ice provider, which a POSITA would understand means Backhaus is designed to work with and across existing phone networks rather than supplanting them:

> [0001] This application is a Continuation-In-Part of the currently pending United States application for patent filed on May 7, 2012, entitled SYSTEM AND METHOD FOR PROVISION OF A SECOND LINE SERVICE TO A TELECOMMUNICATIONS DEVICE and assigned Ser. No. 13/466,074, the entire contents of which are hereby incorporated by reference. Priority is also hereby claimed under 35 U.S.C. §119(e) to U.S. provisional application entitled "***CROSS CARRIER*** MOBILE DEVICE CLIENT USING DATA CHANNEL

> FOR SIP CALL," filed on Jun. 17, 2012 and assigned application Ser. No. 61/660,772, the entire contents of which are hereby incorporated by reference.
>
> …
>
> [0008] Accordingly, what is needed is a system and method for providing a plurality of dedicated phone numbers to a single telecommunications device in such a manner that the user of the device can separate and manage communications on each. Further, what is needed is a system and method for providing a second line service to a device in such a manner that only a single primary phone number is required from the device's primary service provider. Even further, ***what is needed is*** a system and method for providing a second line service to a device in such a manner that ***the second line service can be provided to the subscriber without having to coordinate with the subscriber's primary service provider***.

Ex. 1005 at [0001] and [0008]; *see also id.* at [0121]-[0122] (referencing "cross-carrier" functionality").

112. A POSITA would therefore understand Backhaus to teach the importance of working with and across existing phone networks, and to teach away from any solution that requires coordination or control over conventional phone routing.

113. Winbladh, however, is exactly the kind of reference a POSITA would understand Backhaus to teach away from. Rather than using the conventional call routing system, a POSITA would understand that Winbladh requires control over the routing system (which would either require replacing the existing telephone network or coordinating with the user's service provider, as Backhaus teaches away from). Specifically, Winbladh makes clear that its system involves a "host resource"

that manages multiple call legs, receives the termination request from caller B (in lieu of that termination request being received and processed by the normal network), keeps the call active (in lieu of the normal network terminating the call), receives a call from B to a specified number, provides some backhaul between the re-dialed call from B and the original call leg from A (in lieu of it being routed over the normal network), and then connects those two call legs:

> [0056] In FIG. 4, we assume that a two-legged L1, L2 bi-directional primary connection has been set up between the first terminal A and the second terminal B. According to one preferred embodiment of the invention, as soon as such a connection exists, the terminal B may disconnect the second leg L2, reconnect to the host resource 110 at a local-call rate, and reestablish the connection with the terminal A.
>
> [0057] To this aim, the host resource 110 is specifically adapted to receive a termination request from the second terminal B after having set up the bi-directional primary connection L1, L2 between the terminals A and B. In response to such a request, the host resource 110 is further adapted to disconnect the second leg L2 while maintaining the first leg L1 during a threshold period T after having disconnected the second leg L2.
>
> [0058] If a return call to a predefined telephone number # β r is received from the second terminal B before expiry of the threshold period T, the host resource 110 is adapted to set up a new second leg L2′ and associate this leg with the first leg L1, such that a bi-directional secondary connection L1, L2′ is established between the first terminal A and the second terminal B. Naturally, a precondition for this type of secondary connection L1, L2′ is that no termination request has yet been received from the terminal A.

Ex. 1020 at [0056]-[0058].

114. A POSITA therefore would not be motivated to combine Backhaus and

Winbladh. They are vastly different systems that operate in different ways, and a POSITA would not find it obvious to combine them. Backhaus is expressly designed to plug into and work with a normal telephone network. Winbladh is the opposite: designed to replace a normal telephone network (or, at a minimum, require cooperation with the service provider of a normal network to add the additional terminate and keep active pending re-dial functionality described in Winbladh).

115. The Petition alleges that it would have been obvious because "calls that are long distance or international calls are relatively expensive" and Winbladh permits the second leg call-back to occur at a local rate. Petition at 50. But this does not articulate how, or why, a POSITA would combine Backhaus and Winbladh. A POSITA would understand that in Backhaus, the second leg of the call is between the subscriber and the SLS platform. Because the SLS platform is stationary, the call leg between it and the subscriber will cost the same regardless of which direction the call is placed. A POSITA would understand that the cost of calls is based on the physical path between terminals (*e.g.*, what physical resources are used such as wires or cell towers, what provider networks are passed through, etc.). This cost would be the same in both directions.

116. Further, this local call rationale assumes a long distance call for the second leg, but if the second leg is already local then there would be no reason to make this change.

117. Moreover, even if a POSITA were motivated to save money, there would have been other, simpler ways to modify Backhaus, such as by using multiple SLS platform servers (increasing the likelihood of being within local call range of a given user).

118. Additionally, Backhaus provides a single relationship number for a given subscriber, SLS number, and third party contact. Winbladh's system, on the other hand would require constantly regenerating numbers based on the physical location of the user, which can vary significantly, for example if the user is using a cell phone. The Petition does not explain how these features would work together, and having multiple numbers would interfere with Backhaus' database lookups (or would require the addition of different databases for different locations, which would significantly increase the complexity of combining these systems). A POSITA would not be motivated to make this combination given the conflicting teachings regarding the relationship and call-back numbers.

119. The Petition also argues that "[i]t was well known to accept an incoming call by making an outbound call to a bridge number." Petition at 50 (citing Ex. 1021 at [0016]). I disagree. Exhibit 1021 switching between a data mode and a voice mode in accepting an incoming call. Ex. 1021 at [0016]. There is a statement that the wireless device may make an "outbound call to a bridge number," but one single reference in an unrelated patent application does not support that this was

"well known" to a POSITA at the time of the invention. Furthermore, a POSITA would understand this teaching to be irrelevant to both Backhaus (which does not use an outgoing call to a bridge number to connect to an incoming call) and Winbladh (which accepts the call as normal, and only later re-connects to a previously terminated call).

120. For all the above described reasons, a POSITA would understand that Backhaus and Winbladh are significantly different systems and would not be motivated to combine them. Combining these references would be no simple task and would require significantly more explanation than is provided in the Petition. For example, there is no explanation of how to implement Backhaus' system, which is built based on having fixed relationship numbers, with Winbladh's teaching of changing numbers depending based on the user's location. A POSITA would understand Backhaus teaches away from a system like Winbladh that either supplants normal call routing or requires coordination with a service provider to modify call routing. Thus, a POSITA would not find any attempt to combine these references to make sense or to be easy, predictable, or expected to succeed. A POSITA would therefore not find it obvious to combine Backhaus and Winbladh.

B. Backhaus and Winbladh do not render obvious receiving the call on a switch in [2.a] and connecting with a bridge number via the same switch in [2.b].

121. Limitations [2.a] and [2.b] both recite that the call must be received and

then connected at the same switch (as indicated by the use of antecedent basis "the switch"):

> [2.a] in response to an incoming call to the secondary telephone number received by ***a switch***, retrieving, by a server from a database, a first bridge telephone number to be used for completion of the incoming call to the secondary telephone number, wherein the first bridge telephone number is associated with ***the switch*** such that calls to the first bridge telephone number are automatically routed to ***the switch***; and
>
> [2.b] transmitting, from the server to the telephone handset via at least one data channel, pre-call information including the first bridge telephone number, whereby the pre-call information allows the telephone handset to accept the incoming call to the secondary telephone number by making a first bridge call using the first bridge telephone number to connect the incoming call to the telephone handset via ***the switch***.

Ex. 1001 at cls. [2.a] and [2.b].

122. A POSITA would understand that in order to obtain the cost savings of the proposed construction, the combination would involve reconnecting to a ***different*** switch. If the call were reconnected at the same switch, then there would be no cost savings because the second call leg would be between the same two endpoints (the subscriber and the same switch), and would therefore cost the same.

123. Thus, a POSITA would understand that in order to achieve the benefit the Petition identifies, a different switch would have to be used, which fails to meet the claim language.

124. If the Backhaus-Winbladh combination somehow used the same switch (despite there being no explanation of how or why to do that), then it would not

achieve the costs savings, and a POSITA would not have any reason to combine the references in the first place.

C. Backhaus and Winbladh do not render obvious limitation [2.b]s requirement that the pre-call information allows "the handset to accept the incoming call … by making a first bridge call using the first bridge telephone number to connect the incoming call to the telephone handset via the switch."

125. Limitation [2.b] recites as follows:

> [2.b] transmitting, from the server to the telephone handset via at least one data channel, pre-call information including the first bridge telephone number, whereby the pre-call information allows the telephone handset to accept the incoming call to the secondary telephone number by making a first bridge call using the first bridge telephone number to connect the incoming call to the telephone handset via the switch.

Ex. 1001 at cl. [2.b].

126. Neither Backhaus nor Winbladh teach the handset accepting the incoming call by making a bridge call to using a bridge telephone number.

127. Backhaus is clear that the SLS platform (*i.e.*, the server, not the handset) connects calls by making a call to the subscriber (which does not use the first bridge telephone number[1]):

---

[1] As I explained above, a POSITA would not consider putting the relationship number in the caller ID to be "using the first bridge telephone number to connect the incoming call" because caller ID is not used to connect a call.

> [0054] Returning to the example, now that the relationship number 1.678.222.0001 has been established in connection with subscriber #1 and the calling third party, the SLS platform 115 may proceed to establish the second half of the call—the call from the SLS platform 115 to the subscriber's TD 110. The SLS platform 115 places the call to the primary number 1.408.544.1212 that points to subscriber TD 110 per its primary service provider 201.

Ex. 1005 at [0054]. Thus a POSITA would understand Backhaus does not disclose this limitation and instead teaches the exact opposite: that the server connects the call, not the handset.

128. A POSITA would also understand that Winbladh does not teach this limitation either. The Petition relies on Winbladh's call-back process. Petition at 47-48. Winbladh teaches that this process is to "reestablish" a connection after sending a "termination request":

> [0056] In FIG. 4, we assume that a two-legged L1, L2 bi-directional primary connection has been set up between the first terminal A and the second terminal B. According to one preferred embodiment of the invention, as soon as such a connection exists, the terminal B may disconnect the second leg L2, reconnect to the host resource 110 at a local-call rate, and reestablish the connection with the terminal A.
>
> [0057] To this aim, the host resource 110 is specifically adapted to receive a termination request from the second terminal B after having set up the bi-directional primary connection L1, L2 between the terminals A and B. In response to such a request, the host resource 110 is further adapted to disconnect the second leg L2 while maintaining the first leg L1 during a threshold period T after having disconnected the second leg L2.

Ex. 1020 at [0056]-[0057].

129. A POSITA would understand that the call has already been accepted in

a previous step and therefore is no longer an "incoming" call when the reestablished connection happens. At that point, there is no incoming call to connect to, there is only a previously-terminated (but already accepted) call to reestablish a connection with.

130. Winbladh itself teaches a distinction between "accepting" a call, which relates to the initial call being connected, and "reestablishing" the call, which relates to Winbladh's call-back process. For example, the following paragraphs all refer to a "call-accept message," which Winbladh teaches is "acceptance of the call" and which relates to the initial call being connected (before any call-back process occurs):

> [0011] According to yet another preferred embodiment of the invention, after having routed said call, the host resource is adapted to set up a bi-directional primary connection between the first terminal and the second terminal after having routed said call provided that a ***call-accept message*** is generated by the second terminal. Thus, a conventional telephone conversation can be initiated.
>
> [0014] According to another aspect of the invention the object is achieved by the method described initially, wherein a dialing code is received from the first terminal. The dialing code identifies a first common telephone number in the first home telephone network. The first common telephone number, in turn, is adapted to be shared among a first group of users in the first home telephone network. The method involves receiving user data specifying the first network identity, and routing a call from the first terminal to the second terminal based on a unique combination of the first common telephone number and the first network identity. The method also involves setting up a bi-directional primary connection between the first terminal and the second terminal provided that a ***call-accept message*** is generated by the second terminal. The primary connection is established via at least one interconnecting network of packet switched type.

> [0054] The host resource 110 also receives user data specifying the first network identity CLIA. Typically, this data is forwarded automatically along with dialing code #αn in the form of a CLI. However, according to one preferred embodiment of the invention, it is also possible to use this service from first terminals A having network identities that are not registered with the host resource 110. Namely, if a call is originated from such a terminal A, the host resource 110 will not find a matching entry in the database 120. As a result, the user of the non-registered first terminal A is prompted to enter a valid first network identity CLIA, for example represented by his/her telephone number. Provided that a matching entry is found for this number, the host resource 110 routes the call to the second terminal B. Normally, this involves generating a page signal P. As mentioned earlier, the call is routed based on the unique combination of the first common telephone number #αn and the first network identity CLIA. ***Upon acceptance of the call (i.e. reception of a call-accept message***, or off-hook, from the terminal B), a bi-directional primary connection is set up between the first terminal A and the second terminal B. This connection is here denoted L1 and L2, where L1 symbolizes a first leg between the first terminal A and the host resource 110; and L2 symbolizes a second leg between the host resource 110 and the second terminal B.

Ex. 1020 at [0011], [0014], and [0054].

131. However, for the call-back process, Winbladh describes that functionality as "reestablishing" a connection:

> [0056] In FIG. 4, we assume that a two-legged L1, L2 bi-directional primary connection has been set up between the first terminal A and the second terminal B. According to one preferred embodiment of the invention, as soon as such a connection exists, the terminal B may disconnect the second leg L2, reconnect to the host resource 110 at a local-call rate, and ***reestablish the connection*** with the terminal A.

Ex. 1020 at [0056].

132. Thus, a POSITA would understand Winbladh to teach that the initial connection of the call is "acceptance" (and that connection does not involve the call-

back number, which is the alleged bridge telephone number). A POSITA would understand, based both on their knowledge of the art and Winbladh's express teachings, that the call-back functionality is instead reestablishing a connection, but not "accepting the incoming call" as claimed.

133. Thus, a POSITA would understand that neither Backhaus nor Winbladh disclose pre-call information that allows the handset to "accept the incoming call" by making a bridge call using the bridge telephone number. The combination of Backhaus and Winbladh therefore would fail to render this limitation obvious.

D. Backhaus and Winbladh do not render obvious claims 3, 4, or 6-11.

134. Claims 3, 4, and 6-11 depend on claim 2 and thus incorporate all of its requirements. Therefore, Backhaus and Winbladh fail to anticipate claims 3, 4, and 6-11 for the same reasons they fail to render obvious claim 2, which I described above.

XI. GROUND 3

A. Backhaus in view of Winbladh and Logan does not render obvious claim 5.

135. The Petition does not rely on Logan for any aspect of claim 2. Claim 5 depends on claim 2, and thus incorporates all of its requirements. Therefore, Backhaus, Winbladh, and Logan do not render obvious for all the same reasons that Backhaus and Winbladh fail to render obvious claim 2, which I described above for

Ground 2.

XII. GROUND 4

A. Backhaus in view of Logan and Taylor does not render obvious claim 1.

136. The Petition does not rely on Taylor for any aspect of claim 1 that I discussed above. Thus, Backhaus, Logan, and Taylor fail to render obvious claim 1 for the same reasons Backhaus and Logan fail to render obvious claim 1, which I described above for Ground 1.

XIII. GROUND 5

A. Backhaus in view of Winbladh and Taylor does not render obvious claims 2-4 or 6-11.

137. As I described above, a POSITA would not combine Backhaus and Winbladh, and therefore they would not combine these references with a third reference Taylor.

138. Also, as I described above, Backhaus and Winbladh do not render obvious using the same switch for limitations [2.a] and [2.b] at least because the purported cost savings rationale only makes sense if Winbladh's call-back feature connects to a ***different*** switch. Adding Taylor into this mix does not resolve this problem. It is not clear how or why the Petitioner is proposing to add Taylor to the Backhaus-Winbladh combination, but regardless of how Taylor is added, it would still be the case that the cost-savings rationale only makes sense if a ***different*** switch

is used, in which case this combination would fail to render the claims obvious because they require using the same switch.

139. The Petition does not rely on Taylor for any of the other aspects of claim 2 that I discussed above. Therefore, Backhaus, Winbladh, and Taylor do not render obvious any of claims 2-4 or 6-11 for the reasons I described above for Ground 2.

XIV. GROUND 6

A. Backhaus in view of Logan, Winbladh, and Taylor does not render obvious claim 5.

140. The Petition does not rely on Logan for any aspect of claim 2. Claim 5 depends on claim 2, and thus incorporates all of its requirements. Therefore, Backhaus, Logan, Winbladh, Taylor Logan do not render obvious for all the same reasons that Backhaus, Winbladh, and Taylor fail to render obvious claim 2, which I described above for Ground 5.

XV. ADDITIONAL REMARKS

141. I currently hold the opinions expressed in this Declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare that all statements made are of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: October 26, 2023

By: _____
Dr. Robert Akl, D.Sc.
Dallas, Texas