UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

YMAX CORPORATION,
Petitioner

v.

FOCAL IP, LLC,
Patent Owner

Inter Partes Review No.: Unassigned

U.S. Patent No. 8,155,298

DECLARATION OF TAL LAVIAN, PH.D. IN SUPPORT OF THE PETITION FOR INTER PARTIES REVIEW OF PATENT NO. 8,155,298

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Declaration of Tal Lavian, Ph.D.

I, Tal Lavian, declare as follows:

1. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2. I have been asked to provide technical assistance in connection with inter partes review of U.S. Patent No. 8,155,298 ("the '298 Patent").

3. This declaration is a statement of my opinions on issues related to the invalidity of claims 1 and 20 of the '298 Patent.

I. Background and Qualifications

4. My qualifications are stated more fully in my curriculum vitae. Ex. 1016. Here I provide a brief summary of my qualifications.

5. I have more than 25 years of experience in the networking, telecommunications, Internet, and software fields. I received a Ph.D. in Computer Science from the University of California at Berkeley in 2006 and obtained a Master's of Science ("M.Sc.") degree in Electrical Engineering from Tel Aviv University, Israel, in 1996. In 1987, I obtained a Bachelor of Science ("B.Sc.") in Mathematics and Computer Science, also from Tel Aviv University.

6. I am currently employed by the University of California at Berkeley and was appointed as a lecturer and Industry Fellow in the Center of

Entrepreneurship and Technology ("CET") as part of UC Berkeley College of Engineering. I have been with the University of California at Berkeley since 2000 where I served as Berkeley Industry Fellow, Lecturer, Visiting Scientist, Ph.D. Candidate, and Nortel's Scientist Liaison, where some positions and projects were done concurrently, and others, sequentially.

7. I have more than 25 years of experience as a scientist, educator and technologist. For eleven years from 1996 to 2007, I worked for Bay Networks and Nortel Networks. Bay Networks was in the business of making and selling computer network hardware and software. Nortel Networks acquired Bay Networks in 1998, and I continued to work at Nortel after the acquisition. Throughout my tenure at Bay and Nortel, I held positions including Principal Scientist, Principal Architect, Principal Engineer, Senior Software Engineer, and led the development and research involving a number of networking technologies. I led the efforts of Java technologies at Bay Networks and Nortel Networks. In addition, during 1999-2001, I served as the President of the Silicon Valley Java User Group with over 800 active members from many companies in the Silicon Valley. From 2008 to 2008, I worked as a communications consultant at Ixia, where researched and developed advanced network communications testing technologies.

8. Prior to that, from 1994 to 1995, I worked as a software engineer and team leader for Aptel Communications, designing and developing mobile wireless devices and network software products. These telecommunications cellular devices provided short messaging service (SMS) between base station sand mobile devices. In addition, I developed a network protocol for the base stations and the mobile wireless devices. Furthermore, I developed a GPS-based application to track the quality of signals in urban areas between the mobile devices and the base stations. From 1990 to 1993, I worked as a software engineer and team leader at Scitex Ltd., where I developed system and network communications tools (mostly in C and C++). From 1987 to 1990, I worked as a software engineer and team leader at Shalev, where I developed real-time software and algorithms (mostly in C and C++). From 1983 to 1987, as a student, I worked as a software engineer on several part time projects.

9. I have extensive experience in telecommunications and network communications technologies, including routing and switching architectures and protocols including Multi-Protocol Label Switching Networks, Layer 2 and Layer 3 Virtual Private Networks, Voice over IP (VoIP), telephony systems, PSTN networks, circuit switching, and Pseudowire technologies.

10. Much of my work for Nortel Networks (mentioned above) involved the research and development of these technologies. For example, I wrote software

for Bay Networks and Nortel Networks switches and routers, developed network technologies for the Accelar 8600 family of switches and routers, the OPTera 3500 SONET switches, the OPTera 5000 DWDM family, and the Alteon L4-7 switching product family. I wrote software for Java based device management including software interface to the device management and network management for the Accelar routing switch family network management system.

11. I am named as a co-inventor on more than 80 issued patents and I have co-authored more than 25 scientific publications, journal articles, and peer-reviewed papers. Furthermore, I am a Senior Member of the Institute of Electrical and Electronics Engineers ("IEEE").

12. I currently serve as a Principal Scientist at my company Telecomm Net Consulting Inc., where I develop network communication technologies and provide research and consulting in advanced technologies, mainly in computer networking and Internet technologies. In addition, I serve as a Co-Founder and Chief Technology Officer (CTO) of VisuMenu, Inc., where I design and develop architecture of visual IVR technologies for smartphones and wireless mobile devices in the area of network communications. The backend architecture implements a telephone Private Branch Exchange ("PBX") that makes Session Initiation Protocol ("SIP") based Voice over Internet Protocol ("VoIP") telephone calls to other SIP trunks and telephone services, such as Public Switch Telephone

Network ("PSTN"). The system is based on cloud networking and cloud computing utilizing Amazon Web Services. I have extensive experience with PBX, telecommunications systems, networking equipment, and call centers telephony systems. Additional details of my background are set forth in my curriculum vitae (*see* Ex. 1016), which provides a more complete description of my educational background and work experience.

II. Legal Understanding

13. My opinions are also informed by my understanding of the relevant law, although I am not a lawyer and do not intend to testify about legal issues. I understand that the patentability analysis is conducted on a claim-by-claim basis and that there are several possible reasons that a patent claim may be found to be unpatentable.

14. I understand that earlier publications and patents may act to render a patent unpatentable for one of two reasons: (1) anticipation, and (2) obviousness.

A. Anticipation

15. I understand that a single piece of prior art "anticipates" a claim if each and every element of the claim is disclosed in that prior art. I further understand that, where a claim element is not explicitly disclosed in a prior art reference, the reference may nonetheless anticipate a claim if the missing claim

element is necessarily present in the apparatus disclosed, or is a natural result of the method disclosed—that is, the missing element is "inherent" in what is disclosed.

B. **Obviousness**

16. Second, I understand that the prior art may render a patent claim "obvious." I understand that two or more pieces of prior art that each disclose fewer than all elements of a patent claim may nevertheless be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and one of ordinary skill in the art at the time would have been motivated to combine the prior art. I understand that this motivation to combine need not be explicit in any of the prior art, but may be inferred from the knowledge of one of ordinary skill in the art at the time the patent was filed. I also understand that one of ordinary skill in the art is not an automaton, but is a person having ordinary creativity.

17. I further understand that one or more pieces of prior art that disclose fewer than all of the elements of a patent claim may render a patent claim obvious if including the missing element would have been obvious to one of skill in the art at the time of the alleged invention (that is, if the missing element represents only

an insubstantial difference over the prior art, or a reconfiguration of a known system).

18. I understand that the obviousness analysis must focus on the knowledge available to one of skill in the art at the time of the invention in order to avoid impermissible hindsight. I further understand that the obviousness inquiry assumes that the person having ordinary skill in the art would have knowledge of all relevant references available at the time of the invention.

III. Person Of Ordinary Skill In The Art

19. It is my opinion that a person of ordinary skill in the art with respect to the ’298 Patent in 1999-2000 would have a bachelor’s degree in electrical engineering, computer science, or the equivalent thereof and approximately 2 years of professional experience within the field of telecommunications or network communications.

20. The ’298 Patent concerns the basic architecture of the telephone network that has existed in the United States for many decades, as well as basic Internet technology that was well known by 1999-2000. These topics were covered in detail by that time in books, in publications by standards bodies, and by vendors that provided products and solutions in these areas. Because the technology involved in the ’298 patent involves well-known technologies and functionalities,

an engineer or computer scientist with approximately 2 years of experience in telecommunications would be well-versed in the concepts disclosed in the ’298 patent.

21. My opinions regarding the level of ordinary skill in the art are based on, among other things, my over 25 years of experience in the field of telecommunications, network communications, computer science and engineering, my understanding of the basic qualifications that would be relevant to an engineer or scientist tasked with investigating methods and systems in the relevant area, and my familiarity with the backgrounds of colleagues and co-workers, both past and present.

IV. Summary Of The ’298 Patent

A. Priority Date

22. The face of the ’298 patent reflects a chain of patent applications dating back to May 4, 2000. I have been informed that in pending litigation against Petitioner YMax Corporation in which the ’298 patent is being asserted, the plaintiff asserting infringement has stated that the claims of the ’298 patent may be entitled to a priority date as early as June 1, 1999. For this declaration, I will assume that the ’298 Patent is entitled to the filing date of May 4, 2000, and that it may be entitled to an invention date as early as June 1, 1999.

B. **Overview Of The Challenged Independent Claims**

23. The two claims challenged in the accompanying petition, independent claims 1 and 20 of the '298 patent, are directed towards using a website to configure telephone service options. Claim 20 adds that telephone calls may be transmitted over the conventional telephone network or may be a Voice over IP call (a telephone call transmitted over the Internet). As detailed below, such website-based configuration as well as Voice over IP calls are both in the prior art.

24. More specifically, the '298 Patent summarizes itself as relating to "a system for allowing a subscriber to select features of the subscriber's telephone service and to various novel features that can be selected." Ex. 1001 at 1:20-23.

25. The patent's specification asserts that setting up optional telephony services such as call forwarding[1] "typically require[s] access from the first or second party's device [that is, from a telephone] and are extremely awkward to program." The specification further claims that in the past, setting up such features "required a subscriber to make the feature selection through the telephone business

[1] Call forwarding is the telephone service feature that allows you to redirect a call made to one phone number to another phone number, so that, for example, telephone calls made to your house phone are re-routed to your cell phone, or to your friend's house.

office. Central office workers would then implement the provisioning under request of the business office." Ex. 1001 at 1:49-51, 2:1-13.[2]

26. To address the alleged problems in the prior art, the '298 patent discloses allowing a user to select or modify features for their telephone service "by means of the world wide web." Ex. 1001 at 5:33-64. This "allow[s] a subscriber to remotely control features…" Ex. 1001 at 2:55-57. The patent emphasizes that giving the user "[d]irect 3rd-party control means that the ability to provision the 3rd-party features is directly available to a subscriber, eliminating the need to go through the telephone company (telco) business office." Ex. 1001 at 3:3-6; *see also* Ex. 1001 at 5:33-36 ("FIG. 1 illustrates the preferred method for an authorized subscriber to modify the 3rd-party control criteria by means of the world wide web 22 (and web server 23) using an Internet browser.")[3]

[2] Provisioning is a term of art in telecommunications meaning preparing and configuring a new service for users of the network.

[3] Various parts of the specification focus on two telephony features: branch calling, and caller ID based call routing. None of the claims addressed in the accompanying petition and this declaration, however, contain limitations directed to either of those features.

27. There are two independent claims addressed in my declaration: claims 1 and 20.

28. Claim 1 states the following (*see* Ex. 1001):

> A method for providing user control selections for routing of one or more communications between users of one or more communications networks, wherein the users either 1) initiate a communication, 2) receive a communication, or 3) control a communication, the user control selections provided by a user via access to a web server of a web-enabled processing system connected to operate at least in part with the one or more communication networks, wherein at least one of the communication networks is a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas, the web server of web-enabled processing system facilitating direct access by a user for providing user control selections to the at least one of the switching facilities, the user having a communications device with which to communicate with the web server of the web-enabled processing system, the method comprising the steps of:
>
> > facilitating access by authorized users to the web-enabled processing system, via the web server, the web-enabled processing system coupled to at least one of the switching facilities of the network, the web-enabled processing system configured to route a communication from a specific one of the users to an intended recipient of the users;
> >
> > executing control criteria, via the web-enabled processing system, to control the routing of the one or more communications via the web-enabled processing system, the control criteria predetermined by the users control selections via the web server before the control criteria are executed via the web-enabled processing system, wherein the

web-enabled processing system is configured to perform the following operations to execute the control criteria:

> first, receive a message indicating a communication request from a user initiating a communication for an intended recipient user, wherein the message request is transmitted using a signalling protocol of the at least one communication network;
>
> second, validate and acknowledge said communications request without first forwarding said request to a terminating edge switch within the geographic area of the intended recipient of the users;
>
> third, determine the control criteria for access to the intended recipient of the users;
> fourth, facilitate selection of a routing path over the at least one communication network in accordance with the control criteria for the intended recipient user;
>
> fifth, route the communication in accordance with the control criteria, and
>
> sixth, complete a communications link between the user initiating the communication and the intended recipient of the users, when the intended recipient of the users accepts the communication from the user initiating the communication.

29. Though it does so using a lot of words, Claim 1 essentially claims using a website to configure a telephone system's call forwarding feature for calls received over the conventional telephone network (the PSTN) and a controlling device (called a web-enabled processing system) to effectuate the call forwarding.

30. Claim 20 is similar to claim 1, except that Claim 20 requires that that the controlling device also be connected to "a packet network [such as the Internet] configured to support voice over IP ('VOIP')." *See* Ex. 1001. (underline added) Claim 20 also requires additional well-known website features, such as granting access only to authorized users (for example, with a password).

31. As detailed below, these claimed methods were neither new nor nonobvious as of June 1, 1999. In fact, the ’298 Patent itself admits that the primary elements of these patent claims are in the prior art.

32. For example, in the section of the specification entitled “Background,” the patent acknowledges that Call Forwarding is not just known but a “popular provision.” Ex. 1001 at 2:14-19. The patent also admits that “[t]here are Voice Over Internet Protocol (VoiP) products emerging that provide better user interfaces and control…” Ex. 1001 at 2:48-51. Still further, the patent also admits that "Today, there are web-based companies managing 3rd-party call control, via the toll-switch network, which allow users to enter call control information through a web portal." Ex. 1001 at 1:31-34.

33. Indeed, by July 1, 1999, there was nothing inventive about setting up a website for configuring telephone options rather than having to call customer service. Using a website to configure telephone features was already in the prior art. As one example, U.S. Patent No. 6,463,145 to O'Neal et al. (“O'Neal”)

discloses a system that allows a user to "review and/or modify [their] communication options" (such as "call forwarding") over the world wide web using a "user computer 100" in communication with a "web-site" and a "web server 122." Ex. 1003 at 16:36-64, 7:45-8:22, 11:26-51, Fig. 1.

34. As a further example, U.S. Patent No. 5,958,016 to Chang et al. ("Chang") discloses a system where the user can "review and/or change" their telephone "service control information" (such as "chang[ing] the 'forward to' number") over the world wide web. Ex. 1004 at 18:33-21:27, 2:54-67. In explaining the motivation for this invention, Chang notes that "[i]t is too cumbersome to require the subscriber to call the local telephone company's business office and request each and every one of the routine changes" (underline added) and that "[a] need therefore still exists for a technique which will enable any subscriber to personally access and control their AIN ['Advanced Intelligent Network'] services from a general purpose computer without specially developed hardware or software interfaces." Ex. 1004 at 2:54-67; 4:39-42.

35. This is not surprising because by June of 1999, there were over 3 million websites on the web, including Yahoo (launched in 1994), Amazon (launched in 1995), and eBay (launched in 1995). *See* Ex. 1010. Indeed, in 1996 – over two years prior to June 1, 1999 – eBay hosted over 250,000 auctions that received over one million bids. *See* Ex. 1013.

V. State of the Art Of Telecommunications By June 1999

36. As explained below, the technology claimed in the ’298 patent was well known in the telecommunications field by June 1, 1999. The ’298 patent concerns the basic architecture of the telephone network that has existed in the United States for many decades, as well as basic Internet technology that was well known by 1999-2000. These topics were covered in detail by that time in books, in publications by standards bodies, and by vendors that provided products and solutions in these areas. Exhibits 1021-1026 are just few examples of books, standard bodies publications and products at this time period.

A. THE PSTN / Circuit Switching Networks

37. The PSTN (public switched telephone network) is the world’s collection of interconnected circuit-switching telephone networks.

38. In the United States, the PSTN is the conventional telephone network, primarily built by AT&T when it was “the” telephone company in the United States. Telephone calls have been made over the PSTN in the United States for over a century.

39. In the United States, the PSTN is a countrywide network of switches connected to each other by wires. The wires and switches between them connect the telephone of a calling party to the telephone of the called party. Once a

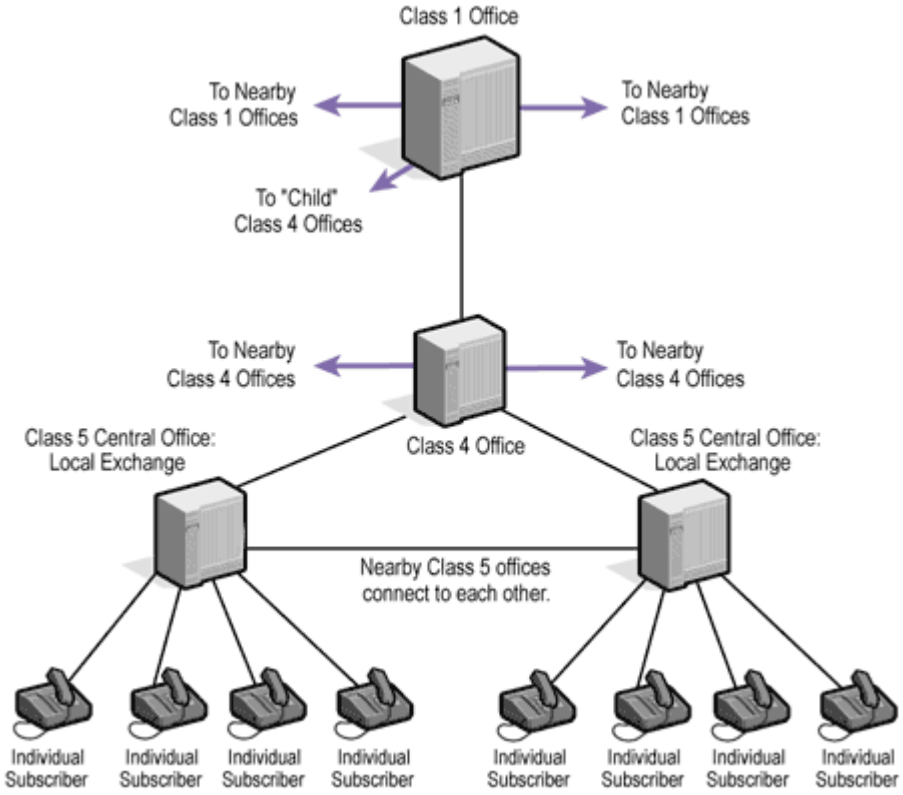
telephone call between two landline telephones is established, there is a continuous physical path of wires, linked by one or more switches, between the telephones at each end of the call that is dedicated solely to that call. This is the meaning of the term "circuit switching." The term refers to the switching of infrastructure from one dedicated use to another. The network focus is on circuit-based, or connection-oriented, systems designed for delivery of voice communications.

40. Even more specifically, the PSTN uses a hierarchy of switches.[4] This makes it possible to scale the telecommunications network to accommodate a large number of end users across the country. Traffic is managed between the various switching offices depending on the type of traffic that was to be connected: local traffic, long distance traffic, and international traffic.

41. The switches in the PSTN use a five-level hierarchy: edge or end (class 5), toll or tandem (class 4), primary (class 3), sectional (class 2) and regional (class 1). Landline phones in people's houses are generally connected to a geographically local class 5 switch (also be called an edge switch, end switch, or central office switch). Telephones in different geographic areas are connected to different edge switches in different central offices. Tandem/Class 4 switches generally connect edge/class 5 switches together, although nearby class 5 switches can be connected directly. In the PSTN, class 2 and 3 switches are used

[4] *See* Ex. 1012.

infrequently, and class 4 switches can be connected to one another as well as by a class 1 switch. The basic architecture of the PSTN can therefore be illustrated by the following diagram:



42. The PSTN switch hierarchy does not mandate physical separation. Switches from one or more adjacent classes (specifically edge and tandem) can be located together in the same physical facility. A combined class 4/class 5 switch is often called a “hybrid” switch.

43. When a telephone call is placed on the PSTN, the call typically travels from the caller’s phone to the edge switch in the caller’s local central office.

Unless the recipient is in the same geographical area and directly connected to the same central office, the call is then typically routed to one or more tandem switches (in sequence), until it reaches the edge switch that is directly connected to the recipient's phone, and finally to the recipient's phone. The switches use the telephone number dialed by the caller to know where to route the call. Thus, the network of switches enables the communication network to connect users either within or outside a local geographic area.

B. S**ignaling**

44. **I**n addition to carrying voice communications, the PSTN also carries signaling, which is information used to control the call. Signaling communicates information the network needs to operate, such as the signal sent to the local central office from a telephone when the handset is picked up that notifies the central office to send the telephone a dial tone, or the signal from the central office that tells a telephone to ring because there is an incoming call. The protocol that is used for signaling on the PSTN is called Signalling System 7, or SS7.[5]

45. The SS7 signaling protocol has been used since well before June 1999. It was first issued by CCITT (for Comite Consultatif International Telephonique et Telegraphique, now known as the ITU-T for Telecommunication Standardization Sector of the International telecommunications Union, the primary

[5] Ex. 1017.

international body for cooperative telecommunications standards) in 1980, and was revised in 1984, 1988, and 1992.

C. Packet-Switching Networks: the Internet and Voice over IP

46. Websites on the Internet were well known even to the general public by June 1, 1999. As noted above, by June of 1999, there were over 3 million websites on the web, including Yahoo, Amazon, and eBay. Leiner *et al*. explain in the February 1997 issue of Communications of the ACM that by early 1997, the Internet was already well established as a commercial platform:

> In the last few years, we have seen a new phase of commercialization. Originally, commercial efforts mainly comprised vendors providing the basic networking products and service providers offering connectivity and basic Internet services. ***The Internet has now become almost a "commodity" service, and much of the latest attention has been on the use of this global information infrastructure as support for other commercial services.***
>
> This activity has been accelerated by the widespread and rapid adoption of browsers and Web technology, giving users easy access to information linked around the globe. Products are

> available for finding, sending, and retrieving that information, and many of the latest developments seek to provide increasingly sophisticated information services on top of basic Internet data communications.

Ex. 1014 (emphasis added.)

47. As explained above, the PSTN is a circuit-switched network, which requires a dedicated point-to-point connection during a phone call. In contrast, the Internet is a packet-switched network. There is no dedicated route between two computers that are communicating over the internet. Rather, information to be transmitted through the Internet is broken down into small blocks called packets, each of which includes the address of the destination computer. Each packet may travel a different route through the connected parts of the Internet before arriving at the destination computer. The packets are then reassembled at the destination computer.

48. TCP/IP is a collection of protocols used for, among other things, sending information through the Internet. The "IP" stands for Internet Protocol.

49. Voice over IP, or VoIP, is the transmission of voice that has been converted into digital packets of data using the Internet Protocol. VoIP

communications typically take place over the Internet, though they could use a private network.

50. As the ’298 patent admits, VoIP was invented and used before the alleged invention of the ’298 patent. *See* Ex. 1001 at 2:48-51 (“There are Voice Over Internet Protocol (VoiP) products emerging that provide better user interfaces and control but they do not take advantage and [sic] voice quality of the PSTN.”)

51. Indeed, a public domain VoIP application NetFone (later called Speak Freely) was released in 1991 by Autodesk. *See* Ex. 1018.

52. The first commercial Internet VoIP application, called Internet Phone, was released by Petitioner’s predecessor VocalTec Communications in February of 1995.

53. U.S. Patent No. 6,031,836 to Haserodt et al. ("Haserodt"), the application for which was filed in 1996, discloses not just Voice over IP telephony, and not just voice communications between a VoIP user and a PSTN user (using both a packet-switched network and a circuit-switched network), but also discloses use of a website to allow users to choose and configure telephony features, such as “redirection of incoming calls to another destination.” *See* Ex. 1015 at 1:10-17 (“It is known in the communications arts that voice calls can be carried by the Internet (or some other data transport network) between a pair of Internet phones or voice-enabled computers. It is also known that voice calls carried by the Internet can be

interfaced by a gateway to the telephone network so that an Internet phone or a voice-enabled computer connected to the Internet can engage in a voice call with a standard telephone connected to the telephone network."); *id.* at 2:33-50 ("Specifically according to another aspect of the invention, a method of accessing telephony features over the Internet by using the World Wide Web (WWW) comprises the following steps. A WWW browser of a client requests a WWW page that defines a telephony feature form from a WWW server via the Internet. The WWW server responds by providing the requested WWW page to the client via the Internet. The WWW browser indicates selection of an individual telephony feature by marking up the telephony feature form of the received WWW page, and the client sends the marked up WWW page via the Internet to an interpreter (e.g., to the WWW server). The interpreter interprets the marked up telephony feature form to determine the selected individual telephony feature. In response to the determination, a provider of the telephony features then provides the selected individual telephony feature. Thus, the conventional WWW browsers are used without modification to access telephony features via the Internet."); *id.* at 5:30-49.

VI. An Embodiment Of The ’298 Patent

A. Summary of the ’298 Patent

54. The ’298 Patent discloses “a system for allowing a subscriber to select features of the subscriber's telephone service.” Ex. 1001 at 1:20-23. One embodiment disclosed in ’298 Patent’s specification uses a “tandem access controller (TAC) 10” that is connected to a “PSTN tandem switch 16” of the “Public Switched Telephone Network (PSTN).” Ex 1001 at 1:42-48; 4:52-66. This configuration is seen in Figure 1:

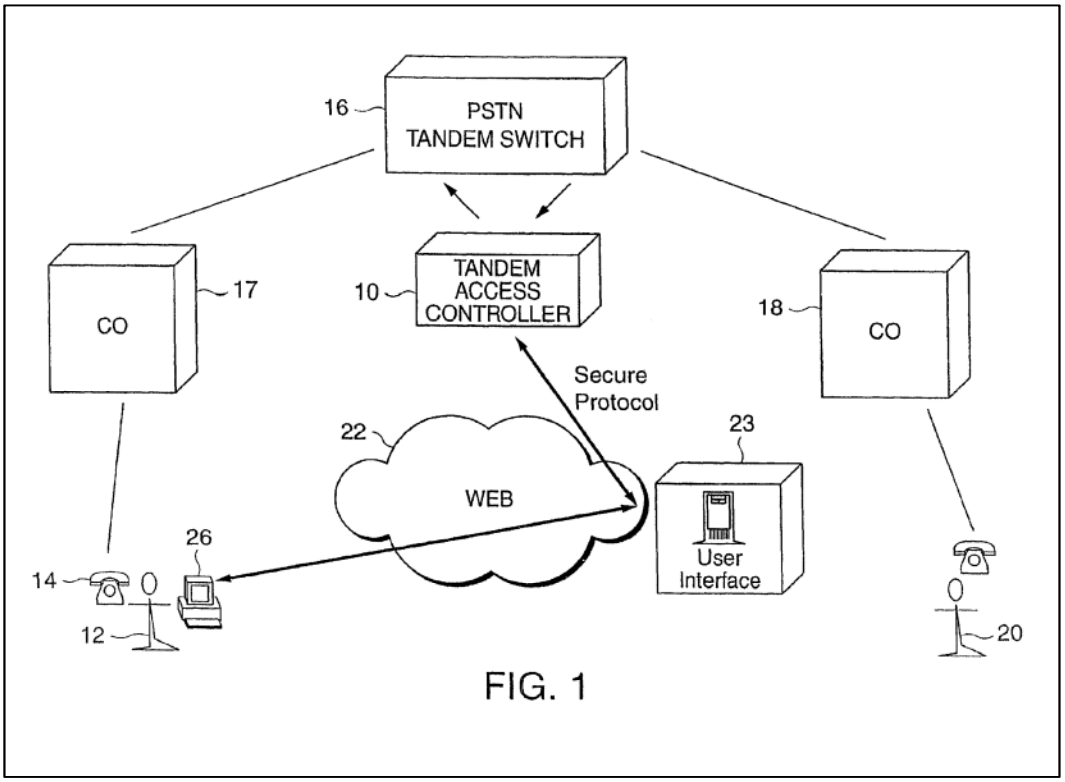


FIG. 1

55. In this embodiment, a subscriber of the system (item 12 in the figure) can select or modify telephone service options such as call forwarding using a

website hosted by a web server (item 23). *E.g.*, Ex. 1001 at 5:33-64. The subscriber's selections will be provided to the Tandem Access Controller 10. *Id.* at 5:61-64. In operation, when a caller (item 20 in Figure 1) calls the subscriber using the "subscriber's public phone number," the call travels from the caller's local Central Office 18 to the tandem switch 16, and then to the Tandem Access Controller ("TAC") 10. *Id.* at 3:14-18. Based on the subscriber's selections, the TAC will determine where to route the telephone call. *Id.* at 3:16-23, 5:5-20, 6:26-29, 10:1-3. For example, using the call option settings made by the subscriber, the TAC 10 may determine a second phone number to which the call should be forwarded, and then will place a second call to the second phone number. *Id*. When the second call is answered, the TAC 10 connects the first call to the second call, "thereby connecting the calling party 20 to the subscriber 12." *Id*.

VII. **Claim Interpretation**

56. I understand that, for purposes of the accompanying petition for Inter Partes Review of the '298 patent, the challenged claims must be given their broadest reasonable interpretations to one of ordinary skill in telecommunications in light of the specification.

A. **"web enabled"**

57. Claim 1 recites "A method performed by a **web enabled** processing system including one or more web servers coupled to a call processing system…"

58. The broadest reasonable interpretation of the phrase "web enabled" is "capable of receiving information from, or sending information over, the Internet's world wide web." This is supported by the specification, which has numerous disclosures of an embodiment of the processing system (the "TAC") either receiving information from, or sending information to, the user via the web. *See, e.g.*, Ex. 1001 at 3:53-56; 4:17-19; 5:33-36; 5:38-40; 6:57-62; 8:23-27.

B. **"processing system"**

59. Claim 1 uses the phrase "web-enabled processing system." Claim 1 further requires the "processing system" to be coupled to a switching facility and to execute control criteria to control routing of communications. *See* Exhibit 1001 at claim 1.

60. In the specification, the Tandem Access Controller in the disclosed embodiments is described as web enabled (as explained above), is coupled to a switching facility (*see, e.g.*, Ex. 1001 at Fig. 1), and executes control criteria to control routing of communications. Furthermore, the Tandem Access Controller is described as a "processor": "In one embodiment, the system includes a processor,

referred to herein as a tandem access controller (TAC), connected to the PSTN …" Ex. 1001 at 3:7-9.

61. Thus, the broadest reasonable interpretation of "processing system" in light of the specification is "a system with a processor."

62. This broadest reasonable interpretation of "processing system" is further confirmed by the two uses of the phrase "processing system" in the specification: (1) "The offered features are implemented by software programs run by the processing system." (2) "The caller ID feature may be implemented by a software program run by the processing system in TAC 10." Ex. 1001 at 3:66-67, 10:66-67. In both instances, the specification speaks of the "processing system" running software, and software is run on processors.

C. **"controller"**

63. Claim 20 recites "a web server coupled to a ***controller***" that receives communications requests and retrieves control criteria to determine a possible route for communications:

> A method of providing a user interaction system to enable users to control routing of one or more communications … comprising a web server coupled to a controller … receiving

and storing the control criteria in a database associated with the server, the ***controller***, or both;

receiving a communication request at the ***controller*** …;

upon receiving the communication request, utilizing the ***controller*** to retrieve at least a portion of the control criteria relating to the user to determine a possible route for the one or more communications from the calling party; …

64. The broadest reasonable interpretation of "controller" in light of the specification is "a device that causes another device to act in a desired way."

65. This interpretation is supported by the specification. A telecommunications switch (like the PSTN tandem switch in Figure 1) determines where to route a telephone call based upon the telephone number provided to it. *See* Ex. 1001 at 4:60-5:10. In the embodiments of the alleged invention in the '298 patent specification, the TAC controls where calls are routed within the PSTN by providing the switch to which it is connected the forwarding phone number to where calls should be re-routed. *See, e.g., id.* at 5:5-10.

66. By providing a destination phone number for a phone call to the PSTN switch, the TAC causes the switch to route the call to the desired destination.

D. **"switching facility" / "switching facilities"**

67. Claim 1 uses the plural phrase "switching facilities," and claim 20 uses the phrase in both singular and plural form. Claim 1 states:

> A method for providing user control selections … the user control selections provided by a user via access to a web server of a web-enabled processing system connected to operate at least in part with the one or more communication networks, wherein at least one of the communication networks is a network comprising edge switches for routing calls from and to users within a local geographic area and ***switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas***, the web server of web-enabled processing system facilitating direct access by a user for providing user control selections to the at least one of the ***switching facilities*** ...

> … the web-enabled processing system coupled to at least one of the ***switching facilities*** of the network, …

And claim 20 states:

> A method of providing a user interaction system … the user interaction system comprising a web server coupled to a controller with access to at least two communication networks, wherein … the second network is coupled to a ***switching facility*** of a network comprising edge switches for routing calls from and to users within a local geographic area and ***switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas***

68. The broadest reasonable interpretation of "switching facility" is "any switch in the communication network." The phrase "switching facility" does not appear in the specification. However, to one of ordinary skill in the art, all switches in a telecommunications network like the PSTN are a "switching facility." This is supported by the "**authoritative source of definitions for terms used** in the preparation of all telecommunication documentation" **for "all Federal departments and agencies"** in effect in 1999, the Federal Standard 1037C (Glossary of Telecommunications Terms) (Aug. 7, 1996), (emphasis added). The

1037C Federal Standard defines "switching facility" and "switching center" as synonyms that broadly mean "a facility in which switches are used to interconnect communications circuits on a circuit-, message-, or packet-switching basis. Synonyms, in telephony, central office, switching exchange, switching facility. Deprecated synonym switch." Ex. 1008 at C-8 (footnote omitted). Notably, this definition does not refer to a particular class of switch; it is the generic, broad term for the location of communication switches of circuits, packets, or messages, and for short, the switches themselves. *See also* Ex. 1009 at 757 (defining "switching centers" to refer to all five classes of switches in the PSTN).

69. In light of the embodiments displayed in Figures 1 and 2 of the '298 patent in which a Tandem Access Controller is shown directly connected to a tandem switch (class 4) and not to the CO (central office, the location of a class 5 switch), and in light of the claim also separately referring to "edge switches," Patent Owner may argue that "switching facility" should be interpreted more narrowly to exclude central offices/edge switches. That, however, is not the broadest reasonable interpretation. Nowhere in the specification did the inventors provide a definition of "switching facilities" that is narrower than the ordinary meaning to those of ordinary skill in the art, such as by defining it to mean "tandem switch," or to mean "all switches other than edge switches." Moreover, as Figures 1 and 2 illustrate, the applicant knew the specific term "tandem switch,"

which refers to a particular class of switch in the PSTN, but chose to use the broad, generic phrase "switching facility" in the claims. That indicates a deliberate intent to broaden the claim beyond the specific embodiments of Figures 1 and 2 involving the tandem switch to include a connection to any kind of switch in the PSTN.

70. In the applicant's February 22, 2010 response in the prosecution history of related U.S. Patent No. 7,764,777, the applicant argued that the then-pending claims were allowable over the Schwab prior art because:

> in Schwab, any 'features' that are applied to calls being routed are <u>via an end office switch</u> (also referred to as an edge switch or a central office (CO) switch). The end office switch connects calls from calling (telephone company subscribers) parties to called parties <u>only</u> within a local geographic area. Consistent with Newton's definition, on which the Examiner relies, Schwab's "end office switch" could arguably be considered to be "within" the PSTN. The PSTN is a configuration of switching facilities for routing calls from calling parties to called parties, comprising a plurality of end office switches (also referred to as central office switches or edge switches (e.g., a class 5 switch)) and a plurality of interconnected

> switching facilities (also referred to as tandem switches)…. Typically, a telephone call involves an originating end office switch, a plurality of tandem switches, and a terminating end office switch. Therefore in Schwab the application of "features" to call routing operations is restricted within the local geographic area of a particular end office switch (local to the calling party that originates the call).

Ex. 1007 at 93-94 (emphasis added).

71. This argument supports the broadest reasonable construction of "switching facility" to be "any switch in the communication network," without an exclusion edge switches. The patent applicants themselves used the phrase "switching facilities" to include all switches of the PSTN, ***including edge switches***: "The PSTN is a configuration of ***switching facilities*** … ***comprising a plurality of end office switches*** (also referred to as central office switches or ***edge switches*** …) and …" *Id.*

E. **"a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" (claim 1) / "the second network is coupled to a switching facility of a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" (claim 20)**

72. The broadest reasonable interpretation of the claim phrase "a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" is "a network with edge switches for routing calls from and to users within a local geographic area and switches for routing calls to other edge switches or other switches local or far, including the PSTN." Alternatively, for purposes of the accompanying petition, this claim phrase need only be interpreted broadly enough to encompass at least the PSTN. This is supported by the specification of the '298 patent, which consistently refers to the TAC in the disclosed embodiments as routing and otherwise processing calls from the PSTN.

73. As detailed above, the PSTN, which is the conventional nationwide telephone network, is a communication network that includes edge switches for routing calls to subscribers within the local geographic area of the edge switch. It also includes other switches that route calls to edge switches or to other switches

(which can be relatively local or in distant geographic areas). This is illustrated by the following annotations to the patent's Figure 1:

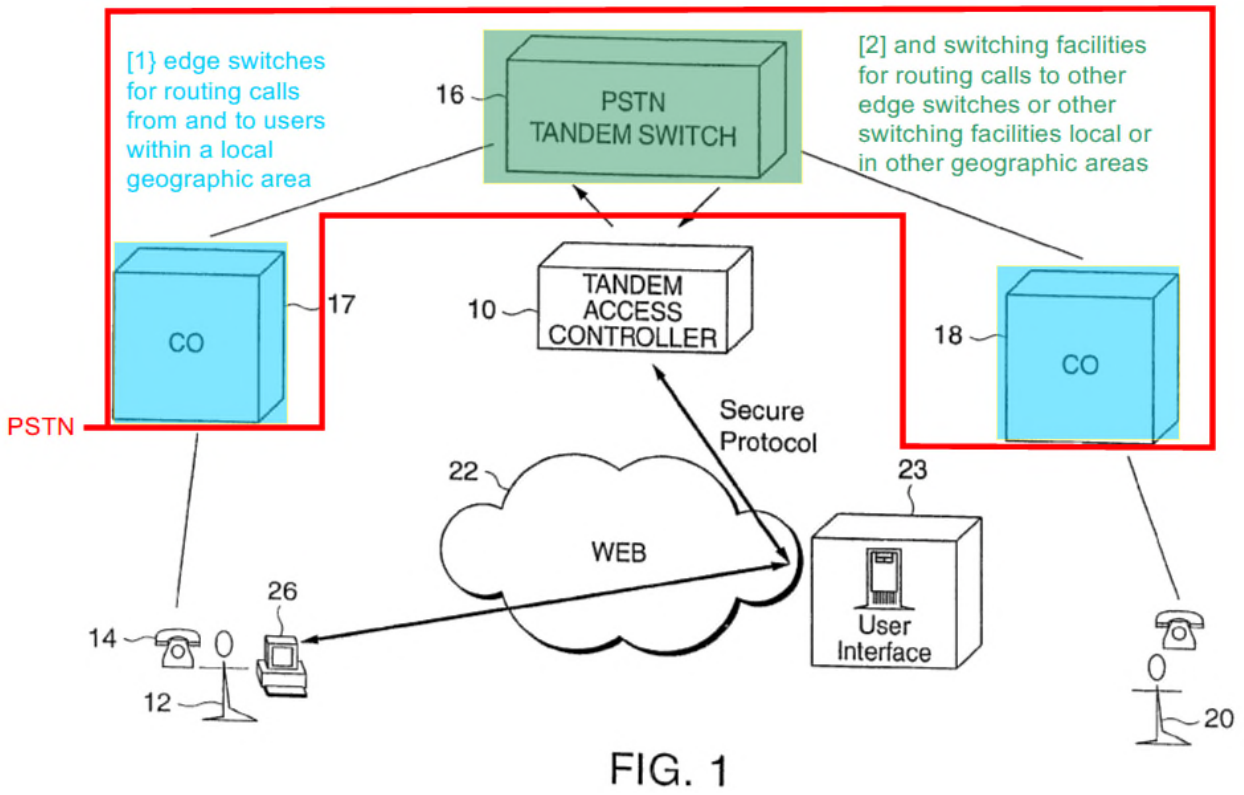


FIG. 1

74. Notably, as written, it is hard to make sense of the actual wording of this limitation as phrased in claim 20. The recited "network comprising edge switches … and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" is plainly intended to cover the PSTN. Yet the claim states that the "second network" is merely "***coupled to*** a switching facility of" such a network. That implies that the second network is not itself the PSTN. But if the second network is not the PSTN, and the claim

separately recites as the first network "a packet network configured to support voice over IP," what is the second network?

75. Nevertheless, in light of the disclosure of the specification in which the claimed embodiments all have the TAC accessing the PSTN, the broadest reasonable interpretation of the "second network" is the same as the "network" of claim 1: "a network with edge switches for routing calls from and to users within a local geographic area and switches for routing calls to other edge switches or other switches local or far, including the PSTN." Alternatively, for purposes of the accompanying petition, this claim phrase need only be interpreted broadly enough to encompass at least the PSTN.

F. **"coupled to"**

76. The broadest reasonable interpretation of the phrase "coupled to" in the limitation "the web-enabled processing system coupled to at least one of the switching facilities of the network" is "connected directly or indirectly." Support for this interpretation can be found at 3:7-28 of the '298 Patent, which explains that the tandem access controller of the '298 Patent can be connected to a tandem switch (an example of a "switching facility") in two ways, described as two embodiments: (1) merely "connected to the PSTN" (3:7-11), which would allow for indirect communication; and (2) "connected internally to the PSTN in a local

service area….Connecting directly to the PSTN tandem switch …" (3:11-28). Thus, "connected" (and its synonym "coupled") is different from, and broader than, "connect[ed] directly."

77. That "coupled to" includes indirect connections can also be seen in claim 124 of related U.S. Patent No. 8,457,113 (Ex. 1011). The claim there recites "A method as defined in claim 1 wherein the one or more web servers ***coupled*** to the call processing system are ***coupled through a data base***." (emphases added). To be coupled through a database requires that "coupled" include indirect connections.

78. That "coupled" encompasses both direct and indirect coupling is also seen in the prosecution history of related U.S. Patent No. 6,529,596. There, the applicant differentiated between a connection and a direct connection by amending the claims to state "said TAC being directly connected to a PSTN tandem switch" in an attempt to overcome prior art. Ex. 1006 at 108.

G. **"validate and acknowledge"**

79. Claim 1 uses the phrase "validate and acknowledge said communications request." The only relevant description or example of validation and acknowledgment of a communications request in the specification of the '298

Patent appears in a flowchart in Figure 5.[6] Figure 5 shows a step in which an incoming call is checked to make sure the number is "Valid":

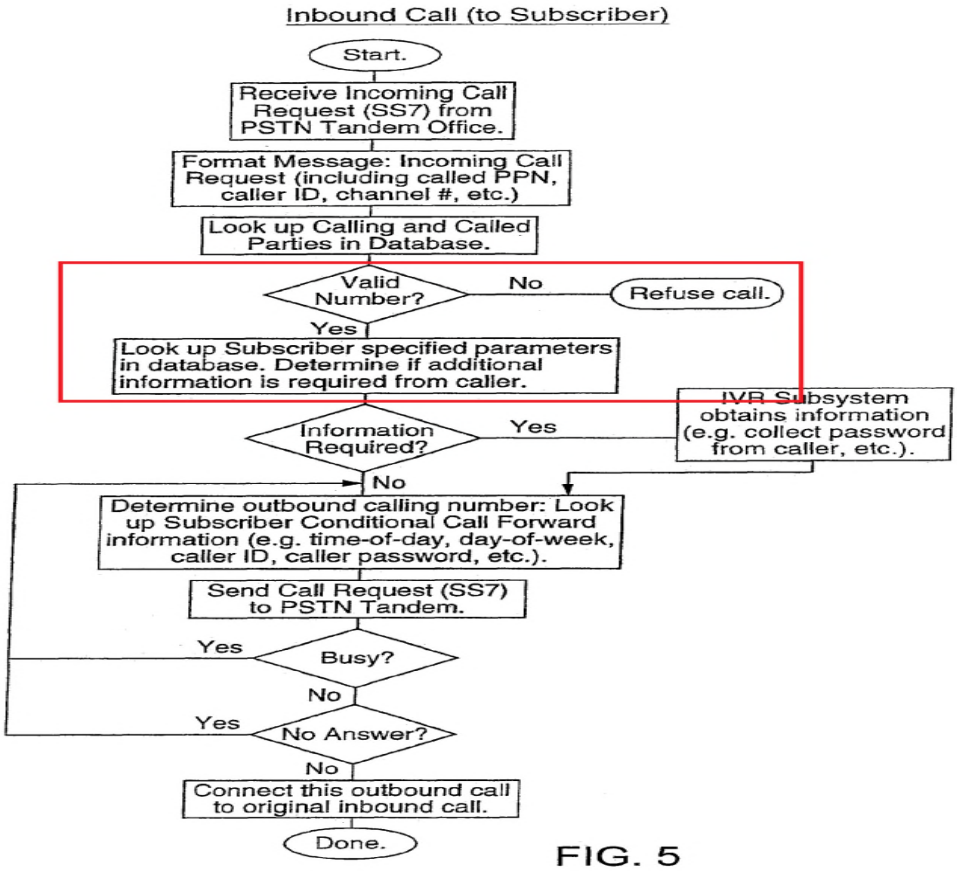


FIG. 5

[6] Figure 4 of the '298 Patent does mention a process of "validat[ing] local database" and "send[ing] acknowledgement message to UIS," but Figure 4 and that validation and acknowledgment concerns configuring the control criteria stored in a database. On the other hand, claim 1 concerns "validat[ing] and acknowledg[ing]" a communication request, such as a request for a telephone call.

80. In Figure 5, if the number is not valid, the call is "refuse[d]." Otherwise, if the call is determined to be valid, the call is processed further.

81. In light of this disclosure in the specification, the broadest reasonable interpretation of the phrase "validate and acknowledge said communications request" is "determine that the communication request is valid and then further process the communication request."

H. **Summary of Claim Interpretation**

Claim Limitation	**Broadest Reasonable Interpretation**
"web enabled"	"capable of receiving information from, or sending information over, the Internet's world wide web."
"processing system"	"a system with a processor"
"controller"	"a device that causes another device to act in a desired way"
"switching facility" / "switching facilities"	"any switch in the communication network"
"a network comprising edge switches for routing calls from and to users	"a network with edge switches for routing calls from and to users within a

within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" (claim 1) / "a second network is coupled to a switching facility of a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas" (claim 20)	local geographic area and switches for routing calls to other edge switches or other switches local or far, including the PSTN." Alternatively, for purposes of the accompanying petition, this claim phrase need only be interpreted broadly enough to encompass at least the PSTN.
"coupled to"	"connected directly or indirectly."
"validate and acknowledge said communications request"	"determine that the communication request is valid and then further process the communication request"

VIII. The Prior Art

A. Prior Art Considered

82. I have reviewed and considered the following documents:

- U.S. Patent No. 6,463,145 to O'Neal et al. (“O'Neal”);
- U.S. Patent No. 5,809,128 to McMullin ("McMullin"); and
- U.S. Patent No. 5,958,016 to Chang et al. ("Chang").

B. Ground 1: O'Neal Anticipate Claims 1 and 20

1. Summary of O’Neal

83. I have reviewed O'Neal, which is entitled “Computer-Implemented Call Forwarding Options and Methods Therefor in a Unified Messaging System.” *See* Ex. 1003. I understand that this patent was filed on January 29, 1999, and was issued on October 8, 2002. *See id.* I understand that O'Neal qualifies as prior art to the ’298 Patent.

84. O’Neal discloses a system and method that allows a subscriber of a call forwarding service to configure call forwarding parameters by using a website.

85. More particularly, O’Neal discloses a “unified messaging system 101” that is connected to the “public telephone network 129” – that is, the “PSTN.” *Id.* at Fig 1, 9:10-119. The unified messaging system includes telephony server 126

that receives calls made to a subscriber and "reroute[s]" the call "in accordance with a subscriber's communication option setting" by "forwarding" the call to the subscriber via an "alternate number." Ex. 1003 at 9:55-58, 11:40-51, 15:14-43.

86. The subscriber may use a "user computer 100" to access the unified messaging system through a website over a "data-centric network 102" such as the internet. Ex. 1003 at 16:35-17:10, 5:41-60, Fig. 1.

87. This website access allows the subscriber to "review and/or modify [their] communication options." Ex. 1003 at 16:36-64, 7:45-8:22, Fig. 1. For example, with regard to call forwarding, the subscriber is "able to check whether it is enabled, verify the forwarding number, select a number from a preprogrammed list, add a new number to a preprogrammed list, or enter a temporary number." Ex. 1003 at 5:62-6:9.

88. After the subscriber modifies a communication option, the modified communication option is "employed to handle subsequent" telephone calls. Ex. 1003 at 7:57-65, 9:4-9.

89. When a caller calls the subscriber, the call is routed over the PSTN (telephony-centric network 129) and received by the telephony server of the unified messaging system. Ex. 1003 at 8:41-62; 9:20-30; 15:14-43; 17:11-49; Fig. 1. The telephony server then uses the subscriber's communication option settings to "decide how to handle the message." Ex. 1003 at 8:41-9:9. If the subscriber has

enabled “call forwarding,” the “telephony server receives the forwarding number from the database server and initiates an outgoing call (step 706) to the forwarding number on another port (e.g., one of the outgoing lines as seen in FIG. 2).” If “the call is accepted” by the subscriber, the telephony server completes the call by “connect[ing] the port of the incoming call with the port of the outgoing call.” Ex. 1003 at 17:11-49; 11:40-51; Figs. 1, 3-4, and 7. In this manner, the telephony server may route the call back through the PSTN to the subscriber “in accordance with a subscriber's communication option setting.” Ex. 1003 at 8:41-62; 9:20-30; 9:55-58; 11:40-51; 15:14-43; 17:11-49; Fig. 1.

90. O’Neal further discloses that the subscriber could be using a computer “enable[d] [with] digital/Internet telephony.” Ex. 1003 at 19:1-8. Digital/Internet telephony is Voice over IP. In such a case, the telephony server can re-route the call to the subscriber through the Internet using Voice over IP (rather than the PSTN) “in accordance with a subscriber's communication option setting.” Ex. 1003 at 9:55-58; 18:19-23; 19:1-8; Fig. 1.

91. In my opinion, O'Neal discloses every element of claims 1 and 20 of the ’298 Patent.

2. Claim 1

[1a] A method for providing user control selections for routing of one or more communications between users of one or more communications networks,

92. O'Neal discloses a "unified messaging system" that routes calls made to subscribers of the unified messaging system's service based on a subscriber's selections ("rerout[ing]" the call "in accordance with a subscriber's communication option setting") such as by "forwarding" the call to the subscriber via an "alternate number." Ex. 1003 at Fig. 1, 9:55-58, 11:40-51, 15:14-43.

[1b] wherein the users either 1) initiate a communication, 2) receive a communication, or 3) control a communication,

93. The unified messaging system can "reroute[]" a call made to a subscriber of the unified messaging system service "in accordance with a subscriber's communication option setting," such as by "forwarding" the call to the subscriber via an "alternate number." Ex. 1003 at 9:55-58, 11:40-51; 15:14-43; Fig. 1. In that way, the subscriber (the user) both controls and receives the call (a communication).

94. Additionally, the subscriber can use the unified messaging system to initiate a communication. Ex. 1003 at Fig. 2, 9:44-55 ("FIG. 2 illustrates, in accordance with one embodiment of the present invention, how the 48 telephone lines provided per TI link may be divided among the subservers of telephony

server 126. As shown in FIG. 2, 45 of the telephone lines may be employed by a main message server 202 to handle the incoming/outgoing voice calls, the incoming voice mail messages, and the incoming facsimiles. Of the 45 telephone lines, 32 may be provisioned for the subscribing or non-subscribing users to dial into the unified messaging system, and the other 13 telephone lines may be employed to allow outgoing calls to be made from within the unified messaging system"); 16:16-18 ("As one of the options, the subscriber may be given a choice (with proper authentication) to use the unified messaging system to originate an outgoing call.").

[1c] the user control selections provided by a user via access to a web server of a web-enabled processing system connected to operate at least in part with the one or more communication networks,

95. The unified messaging system is a web-enabled processing system. In particular, the unified messaging system includes telephony server 126. A server is a computer that contains a processor, thus inherently disclosing a device with a processor. *See also* Ex. 1003 at Fig. 1, 7:45-50 ("Typically, a server represents a computer that processes data …"), 8:41-9:9.

96. In addition, the unified messaging system includes a "web server 122 [that] is employed to facilitate interaction between unified messaging system 101 and data-centric network 102" such as the "internet." Ex. 1001 at 8:8-22, 16:35-

64, Figs. 1 and 3-4. By definition, a "web server" is inherently capable of receiving information from, or sending information over, the internet's world wide web, making the unified messaging system "web enabled."

97. Furthermore, O'Neal discloses that when a subscriber (user) wants to "review and/or modify [their] communication options" (user control selections), the subscriber "access[es] the unified messaging system web site, using a unified messaging system web address." Ex. 1003 at 16:36-64, 7:45-8:22, Fig. 1. This "web site request connects to the web server 122" and the "web server 122 serves up a login page." *Id*. If the subscriber is authenticated, "the subscriber may then be presented with a graphical menu of the communication options (step 610) that allows the subscriber to … review and/or modify the communication options via user computer 100 (step 612)." *Id*. This confirms that the unified messaging system can send information over the world wide web as well as receive information over the world wide web.

98. ***[1d] wherein at least one of the communication networks is a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas,*** O'Neal explains that the telephony-centric network 129 can be the "Public Service Telephone Network (PSTN)." Ex. 1003 at 9:10-19. The PSTN is the prime

example of a communication network that comprises "edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas."

99. Indeed, this is admitted by the '298 Patent as well as by the Patent Owner in a related application. *See* Ex. 1001 at 1:42-48 ("The Public Switched Telephone Network (PSTN) consists of a plurality of edge switches connected to telephones on one side and to a network of tandem switches [(which is an example of a switching facility)] on the other."); Ex. 1019 at 11 ("It is well known that a conventional PSTN includes edge switches (commonly referred to as central office switches or C.O. switches) that originate and terminate calls for connected subscribers, and tandem switches which route these calls internally within the PSTN (i.e. tandem switches are not capable of originating or terminating PSTN calls, but rather directs calls to/from an edge switch or another tandem switch)."; *see also* Ex. 1001 at 1:49-51 (noting the "local" telephone company services its customers through the edge switch at the central office).

[1e] the web server of web-enabled processing system facilitating direct access by a user for providing user control selections to the at least one of the switching facilities,

100. As explained above, the subscriber "review[s] and/or modif[ies] communication options" (i.e., provides user control selections) by "accessing the unified messaging system web site, using a unified messaging system web address." Ex. 1003 at 16:36-64, 7:45-8:22, Fig. 1. Web sites are provided by web servers, and in O'Neal, the web server is disclosed in the embodiment of Figure 1 as item 122. *See id.*; *see also* Ex. 1003 at Fig 1, 8:7-22 ("A web server 122 is employed to facilitate interaction between unified messaging system 101 and data-centric network 102. Web server 122 … is employed, for example, to present to user computer 100 the log-in screen when a subscriber employs user computer 100 to access the unified messaging service. Once that subscriber is properly authenticated (e.g, through a password …) web server 122 then communicates with data base server 120 to obtain the current communication option settings for that subscriber and to display the current communication option settings and an individualized web page to the subscriber for review.")

101. The ability to "review and/or modify the communication options" by using the unified messaging system's website is the claimed "direct access" for providing user control selections.

102. An example disclosed in O'Neal of "the communication options which are reviewable and editable through any suitable computer" is "call forwarding." Ex. 1003 at 5:62-6:9; 11:26-51. The call forwarding option "enables

a user to reroute calls from one telephone to another." *Id.* "If the call forwarding option is enabled, that call is then forwarded to the forwarding number specified by telephony server 126 via an outgoing telephone line" – which means over the PSTN. *See id.* Forwarding a call to a forwarding number via an outgoing telephone line results in the each of the PSTN's switching facilities along the way to the call's destination routing the phone call pursuant to the forwarding telephone number specified by the subscriber on the website. Thus, the user's control selection is provided to "at least one of the switching facilities."

[1f] the user having a communications device with which to communicate with the web server of the web-enabled processing system,

103. The subscriber uses "user computer 100" to communicate with web server 122 of the unified messaging system. Ex. 1003 at 16:36-64, 7:45-8:22, Fig. 1. A computer is a communications device.

[1g] the method comprising the steps of: facilitating access by authorized users to the web-enabled processing system, via the web server,

104. O'Neal explains that the "web server 122" facilitates access to the subscriber by use of a username and password, thus ensuring they are "authorized users," before allowing the subscriber to "review and/or modify [their] communication options" via the web page provided by the web server of the unified messaging system. Ex. 1003 at 16:36-64, 7:45-8:22, Fig. 1.

[1h] the web-enabled processing system coupled to at least one of the switching facilities of the network,

105. The unified messaging system is connected to telephony-centric network 129, such as the PSTN. Ex. 1003 at Fig. 1, 9:10-19. Being connected to the PSTN inherently means being connected to one of the PSTN's switches; essentially all connections to the PSTN are connections to one of the PSTN's switches.

106. Furthermore, even if "switching facilities" were to be interpreted narrowly to exclude edge switches (an interpretation that in my view would not be the broadest reasonable interpretation for the reasons explained above), the connection to the PSTN in O'Neal is in any event an indirect connection to the tandem switches of the PSTN. A tandem switch can be reached directly (or, at worst, through other PSTN switches) from any PSTN edge switch. *See*, *e.g.*, Ex. 1019 at 11 ("It is well known that a conventional PSTN includes edge switches (commonly referred to as central office switches or C.O. switches) that originate and terminate calls for connected subscribers, and tandem switches which route these calls internally within the PSTN (i.e. tandem switches are not capable of originating or terminating PSTN calls, but rather directs calls to/from an edge switch or another tandem switch).")

[1i] the web-enabled processing system configured to route a communication from a specific one of the users to an intended recipient of the users;

107. The unified messaging system (the web-enabled processing system) receives a call made by a caller ("a specific one of the users") to an intended recipient, and is configured to route the call in accordance with a subscriber's communication option settings. *See* Ex. 1003 at 9:55-58, 11:40-51, 15:14-43, Fig. 1.

[1j] executing control criteria, via the web-enabled processing system, to control the routing of the one or more communications via the web-enabled processing system,

108. O'Neal explains that the web-enabled unified messaging system includes a "database server 120" which stores "a data store of subscriber accounts and communication option settings associated therewith. Incoming messages to a particular subscriber or outgoing messages from that subscriber are formatted and routed in accordance with the communication option settings stored in the subscriber communication profile database." Ex. 1003 at 7:45-65, Fig. 1. The "communication option settings" for a subscriber include various communication options, such as "call forwarding." Ex. 1003 at 11:26-12:65. These communication option settings are control criteria executed by the unified messaging system.

109. For example, when the telephony server of the unified messaging system in O'Neal receives the call, the telephony server translates the "telephone signals" of the call into "digital data", and then "employs the digital data to decide how to handle the [call] using the communication option settings obtained from the subscriber communication profile database." Ex. 1003 at 8:41-9:9. Furthermore, "[o]nce the communication option settings are reflected in the subscriber communication profile database stored in database server 120, the new communication option settings are consulted each time a message needs to be handled by the unified messaging system." *Id*. This discloses executing control criteria, via the web-enabled processing system, to control the routing of the one or more communications via the web-enabled processing system.

[1k] the control criteria predetermined by the users control selections via the web server before the control criteria are executed via the web-enabled processing system,

110. Subscribers "review and/or modify communication options" – which are the users' control selections -- through the website provided by the unified messaging system's web server 122. Such "review and/or modif[ication]" of the communication options is the claimed "user control selection[]," resulting in "control criteria" that, as noted above, are stored in a database. *E.g.*, *id.* at 7:45-65; 8:7-22.

111. "Properly authorized changes to the communication option settings will be reflected in the communication option settings stored in the subscriber communication profile database and employed to handle ***subsequent*** messages (whether incoming or outgoing)." Ex. 1003 at 7:57-65, 13:10-15 (emphasis added). The "properly authorized … communication option settings" are "predetermined" because they are used to route "subsequent" calls.

[1l] wherein the web-enabled processing system is configured to perform the following operations to execute the control criteria: first, receive a message indicating a communication request from a user initiating a communication for an intended recipient user,

112. O'Neal explains that a caller can use their "telephone 130" to "call the subscriber." Ex. 1003 at 9:20-30, 15:14-43, Fig. 1. This call is routed over the telephony-centric network 129 and is received by the unified messaging system (the web-enabled processing system). *Id*. at 8:41-62, 9:20-30, 15:14-43, Fig. 1. More specifically, the call is received by the telephony server 126 of the unified messaging system. *Id*. Thus, the telephony server / unified messaging system / web-enabled processing system receives a message indicating a communication request from a user initiating a communication for an intended recipient user.

[1m] wherein the message request is transmitted using a signalling protocol of the at least one communication network;

113. Before being received by the telephony server, the call can be routed through the telephony-centric network 129. Ex. 1003 at 8:41-62; 9:20-30; 15:14-43; Fig. 1. The telephony-centric network can be the PSTN. Ex. 1003 at 9:10-18. When a call is placed on the PSTN – that is, when a caller picks up the phone and dials a telephone number – the PSTN transmits a message request using a signaling protocol of the PSTN. Specifically, since the 1980s, the PSTN has used a signaling protocol called Signalling System 7 (SS7) to establish (set up) and end (tear down) telephone calls. This is inherent in communications on the PSTN, and is confirmed by the '298 Patent, which explains that "Signaling System No. 7 (SS7) is a global standard for telecommunications and defines the procedures and protocol by which network elements in the PSTN exchange information (including the caller ID) over the telephone network for call set up, routing, and control." Ex. 1001 at 8:9-14 (emphasis added). As such, disclosure of a telephone call being routed through the PSTN inherently discloses transmitting message requests through use of the PSTN's signaling protocol.

[1n] second, validate and acknowledge said communications request without first forwarding said request to a terminating edge switch within the geographic area of the intended recipient of the users;

114. In O'Neal, the call is routed over the telephony-centric network 129 and is received by the telephony server 126 of the unified messaging system (the

web-enabled processing system). Ex. 1003 at 8:41-62, 9:20-30, 15:14-43, Fig. 1. The telephony server then uses the "dialed digits" of the call "to obtain the communication option settings associated with the account represented by the dialed telephone number (step 506)," and "reroute[s]" the call "in accordance with a subscriber's communication option setting." Ex. 1003 at 9:55-58, 11:40-51, 15:14-35.

115. As noted above, the broadest reasonable interpretation of "validate and acknowledge said communication request" means determine that the communication request is valid and then further process the communication request. O'Neal's disclosure of obtaining the communication option settings associated with the account of a dialed number in response to receiving a call to that dialed number (a communication request) inherently discloses the claimed validation and acknowledgment. Before it can obtain the communication option settings associated with the account, O'Neal's telephony server must first determine whether the called number corresponds to a stored account. That is the claimed validation. If so, it (as disclosed) further process the call by obtaining the communication option setting from the stored account and rerouting the call in accordance with the communication option settings.

116. This validation and acknowledgement of the call by the telephony server occurs prior to the call being forwarded to the subscriber. Thus, it discloses

"without first forwarding said request to a terminating edge switch within the geographic area of the intended recipient of the users." As is explained above, when a telephone call is placed on the PSTN, the call typically travels from the caller's phone to the edge switch in the caller's local central office. Unless the recipient is in the same geographical area and directly connected to the same central office, the call is then typically routed to one or more tandem switches (in sequence) until it reaches the edge switch that is directly connected to the recipient's phone, and finally to the recipient's phone. The edge switch that is directly connected to the recipient's phone is the "terminating edge switch within the geographic area of the intended recipient of the users" recited in claim 1.

117. Therefore, the validation and acknowledgement of the communication request in O'Neal occurs before the telephony server routes the call to the subscriber in accordance with the subscriber's communication option setting. Because this routing to the subscriber is what causes the call to be forwarded to the "terminating edge switch within the geographic area of the intended recipient of the users," the validation and acknowledgement of O'Neal occurs "without first forwarding said request to a terminating edge switch within the geographic area of the intended recipient of the users."

[1o] third, determine the control criteria for access to the intended recipient of the users;

118. The telephony server 126 of the unified messaging system "employs the digital data to decide how to handle the [call] using the communication option settings obtained from the subscriber communication profile database." Ex. 1003 at 8:41-9:9. "Once the communication option settings are reflected in the subscriber communication profile database stored in database server 120, the new communication option settings are consulted each time a message needs to be handled by the unified messaging system." *Id*. (emphasis added) The unified messaging system then "reroute[s]" the call "in accordance with a subscriber's communication option setting." Ex. 1003 at 5:62-6:4; 9:55-58; 11:40-51; 15:14-43; Fig. 1 (emphasis added).

[1p] fourth, facilitate selection of a routing path over the at least one communication network in accordance with the control criteria for the intended recipient user;

119. The UMS "consults" the communication option settings "each time a message needs to be handled by the unified messaging system." Ex. 1003 at 8:41-9:9. The unified messaging system then "reroute[s]" the call "in accordance with a subscriber's communication option setting." Ex. 1003 at 5:62-6:4; 9:55-58; 11:40-51; 15:14-43; Fig. 1. To reroute the call, "the telephony server receives the

forwarding number from the database server and initiates an outgoing call (step 706) to the forwarding number on another port (e.g., one of the outgoing lines as seen in FIG. 2)." Ex. 1003 at 17:11-49. By determining the forwarding number and initiating an outgoing call on another port to the subscriber, the unified messaging system facilitates selection of a routing path over the at least one communication network in accordance with the control criteria.

[1q] fifth, route the communication in accordance with the control criteria, and

120. The unified messaging system "reroute[s]" the call "in accordance with a subscriber's communication option setting." Ex. 1003 at 5:62-6:4; 9:55-58; 11:40-51; 15:14-43; Fig. 1. It does this by "receiv[ing] the forwarding number from the database server and initiat[ing] an outgoing call (step 706) to the forwarding number on another port (e.g., one of the outgoing lines as seen in FIG. 2)." Ex. 1003 at 17:11-49.

[1r] sixth, complete a communications link between the user initiating the communication and the intended recipient of the users, when the intended recipient of the users accepts the communication from the user initiating the communication.

121. When the outgoing call to the subscriber "is accepted," "the telephony server [126] then connects the port of the incoming call with the port of the outgoing call (step 710) to complete the end-to-end connection (step 712)." Ex.

1003 at 17:29-42. This completion of the end-to-end connection completes a communication link between the caller and the intended recipient.

3. Claim 20

[20a] A method of providing a user interaction system to enable users to control routing of one or more communications between a calling party and a called party through user input,

122. O'Neal discloses a method of providing a system that enables users to control routing of communications between a calling party and a called party through user input. O'Neal's "unified messaging system 101" receives calls made by a calling party to a subscriber (the called party) and "reroute[s]" the call to the subscriber "in accordance with a subscriber's communication option setting", such as by "forwarding" the call to the subscriber via an "alternate number." Ex. 1003 at 5:62-6:4, 9:55-58, 11:40-51, 15:14-43, Fig. 1.

123. O'Neal explains that the subscriber may "review and/or modify [their] communication options" by "accessing the unified messaging system web site, using a unified messaging system web address." Ex. 1003 at 16:36-64; 7:45-8:22; Fig. 1. This website allows the subscriber to control routing of communications by choosing from several different communication options for routing calls, such as

"call forwarding", "'follow me' service", or "alternate number service." Ex. 1003 at 11:13-12:65, Figs. 3-4.

[20b] the user interaction system comprising a web server coupled to a controller with access to at least two communication networks,

124. The unified messaging system includes a "web server 122 [that] is employed to facilitate interaction between unified messaging system 101 and data-centric network 102 [(such as the 'Internet')]." Ex. 1001 at 8:8-22; 16:35-64; Figs. 1 and 3-4. The web server is connected to a telephony server 126. The telephony server is a controller that can, among other things, "reroute" calls "in accordance with a subscriber's communication option setting." Ex. 1003 at 5:62-6:4; 9:55-58; 11:40-51; 15:14-43; Fig. 1. It is a "controller" because by forwarding a call to the user selected forwarding number, it is causing the switches of the PSTN to route the call to the desired number.

125. More particularly, the telephony server, part of the unified messaging system, is "coupled to the data-centric network [102] and the telephony-centric network [129]," both of which are communication networks. Ex. 1003 at 5:23-29; 7:6-14; 9:10-19; Fig. 1. The unified messaging system may receive calls from the telephony-centric network 129 (such as the PSTN) and reroute calls to the subscriber through at least the telephony-centric network 129. Ex. 1003 at 8:41-62; 11:40-51; 15:14-43; 17:11-49; Fig. 1. Such re-routing means addressing the phone

call to the forwarding number; the forwarding number is used by the switches in the PSTN to route the call to the desired forwarding number.

126. The data-centric network 102 allows the subscriber to connect to the unified messaging system via a website hosted by the webserver to "review and/or modify [their] communication options". Ex. 1003 at 8:8-22; 16:36-64; Fig. 1.

[20c] wherein at least one of the networks is a packet network configured to support voice over IP ("VOIP"),

127. In O'Neal, the data-centric network is the "Internet". Ex. 1003 at 7:6-14; Fig. 1. The Internet is a packet network and is configured to support voice over IP ("VOIP"). Ex. 1003 at 19:1-8 (explaining that the subscriber can interact with the unified messaging system using "any computer that is configured to function as a phone set, i.e., a computer equipped with a speaker, microphone, and appropriate software to enable digital/Internet telephony.") (emphasis added). O'Neal's disclosure of enabling "digital/Internet telephony" ***is*** the claimed Voice over IP. VoIP is the sending of digitized voice in packets over an IP network such as the Internet.

[20d] and the second network is coupled to a switching facility of a network comprising edge switches for routing calls from and to users within a local geographic area and switching facilities for routing calls to other edge switches or other switching facilities local or in other geographic areas,

128. As explained above in connection with the broadest reasonable construction of "a network comprising edge switches …", the PSTN is an example of the claimed second network.

129. As described above, O'Neal's unified messaging system has access to the PSTN.

[20e] comprising the steps of providing a website for the users to view features associated with the routing of the one or more communications;

130. The unified messaging system has a website that allows subscribers to review and/or modify communication options. Ex. 1003 at 16:36-64; 7:45-8:22; Fig. 1. Specifically, when the subscriber wants to "review and/or modify [their] communication options," the subscriber "access[es] the unified messaging system web site, using a unified messaging system web address." *Id.* This "web site request connects to the web server 122 via data link 104 and network interface system 105" and the "web server 122 serves up a login page using, for example, ASP-active server pages (step 604)." *Id.* Using the website, "the subscriber may then be presented with a graphical menu of the communication options (step 610) that allows the subscriber to … review and/or modify the communication options via user computer 100 (step 612)." *Id.* The website allows subscribers to choose from several different communication options for routing calls, such as "call forwarding", "'follow me' service", or "alternate number service." Ex. 1003 at

11:13-12:65; Figs. 3-4. Furthermore, with regard to the "call forwarding" option, the subscriber "is able to check whether it is enabled, verify the forwarding number, select a number from a preprogrammed list, add a new number to a preprogrammed list, or enter a temporary number." Ex. 1003 at 5:62-6:9.

[20f] facilitating certain of the users to sign up to become subscribers of the communication networks through the entry of user personal data through the website;

131. In O'Neal, a "subscriber" accesses the unified messaging system through a web site and web server 122 that "authenticate[s]" the subscriber. Ex. 1003 at 16:36-64; 7:45-8:22; Fig. 1. The "authentication procedure" of O'Neal requires the subscriber to "enter[] authentication data", which may include "a numeric password, an alphanumeric password, … and biometrics (e.g., retina scans, hand prints, palm prints, finger prints, voice recognition, etc.)." *Id*.

132. In order to become a subscriber, the users of O'Neal have "sign[ed] up to become subscribers." Additionally, the "numeric password, [the] alphanumeric password, … and [the] biometrics (e.g., retina scans, hand prints, palm prints, finger prints, voice recognition, etc.)" is personal data that must have been entered into the web site of O'Neal at the same time (or after) the user sign up procedure. Otherwise, it would not be accessible to the web site and web server 122 for the authentication process. In light of this, one of ordinary skill in the art would

understand that O'Neal discloses "facilitating certain of the users to sign up to become subscribers of the communication networks through the entry of user personal data through the website."

[20g] granting access to authorized ones of the users;

133. In O'Neal, a "subscriber" accesses the unified messaging system through a web site and web server 122 that "authenticate[s]" the subscriber. Ex. 1003 at 16:36-64; 7:45-8:22; Fig. 1. If the subscriber is authenticated, the subscriber is granted access to the unified messaging system: "If authenticated, the subscriber may then be presented with a menu that allows the subscriber to review and/or change the communication options via key press or voice commands." Ex. 1003 at 16:36-64; 7:45-8:22; Fig. 1.

[20h] providing a menu of available features, via the website, for the users to make feature selections;

134. O'Neal discloses in connection with its website that "[i]f authenticated, the subscriber may then be presented with a menu that allows the subscriber to review and/or change the communication options via key press or voice commands." Ex. 1003 at 16:36-64; 7:45-8:22; Figs. 1 and 3-4. Examples of the menu are seen in Figures 3-4. Ex. 1003 at Figs. 3-4.

[20i] processing of feature selections into control criteria;

135. O'Neal discloses that "[p]roperly authorized changes to the communication option settings will be reflected in the communication option settings stored in the subscriber communication profile database and employed to handle subsequent messages (whether incoming or outgoing)." Ex. 1003 at 7:57-65. Thus, when the changes to the communication options are "[p]roperly authorized," the changed communication options are processed into control criteria to be used to handle subsequent calls to the subscriber.

[20j] receiving and storing the control criteria in a database associated with the server, the controller, or both;

136. "Properly authorized changes to the communication option settings will be reflected in the communication option settings ***stored in the subscriber communication profile database*** and employed to handle subsequent messages (whether incoming or outgoing)." Ex. 1003 at 7:57-65 (emphasis added). This discloses the claimed receiving and storing the control criteria in a database.

137. The "subscriber communication profile database itself may reside with database server 120." Ex. 1003 at 7:54-57. This database server 120 is connected to and accessed by the telephony server 126, both of which are part of the unified messaging system 101. Thus, the database is associated with the telephony server (the "controller").

[20k] receiving a communication request at the controller, from the calling party to an intended called party;

138. O'Neal explains that a caller can use their "telephone 130" to "call the subscriber." Ex. 1003 at 9:20-30; 15:14-43; Fig. 1. This call is routed over the telephony-centric network 129 and is received by the unified messaging system at the telephony server 126 (the controller). Ex. 1003 at 8:41-62; 9:20-30; 15:14-43; Fig. 1. The call is a communication request.

[20l] upon receiving the communication request, utilizing the controller to retrieve at least a portion of the control criteria relating to the user to determine a possible route for the one or more communications from the calling party; and

139. After receiving the call, the telephony server 126 "decide[s] how to handle the [call] using the communication option settings obtained from the subscriber communication profile database." Ex. 1003 at 8:41-9:9; 13:10-15.

140. For example, the communication option settings for a subscriber may indicate that the "call forwarding" option is enabled, and that calls to the subscriber should be forwarded to a particular number. Ex. 1003 at Fig. 3. When this occurs "the telephony server receives the forwarding number from the database server and initiates an outgoing call (step 706) to the forwarding number on another port (e.g., one of the outgoing lines as seen in FIG. 2). … If the outgoing call is successfully connected to the telephony server (step 708), the telephony server then connects

the port of the incoming call with the port of the outgoing call (step 710) to complete the end-to-end connection (step 712)." Ex. 1003 at 17:11-49; 11:40-51; Figs. 1, 3-4, and 7. In this example, receiving the "call forwarding" number discloses "utilizing the controller to retrieve at least a portion of the control criteria relating to the user to determine a possible route for the one or more communications from the calling party."

[20m] executing the control criteria to facilitate the routing of the one or more communications across at least one of the at least two networks.

141. The telephony server will use the control criteria to facilitate routing of the call across at least one of the two networks. For example, a subscriber's communication option settings (the control criteria) may indicate that the "call forwarding" option is enabled, and that calls to the subscriber should be forwarded to a particular number. Ex. 1003 at Fig. 3. When this occurs, "the telephony server receives the forwarding number from the database server and initiates an outgoing call (step 706) to the forwarding number on another port (e.g., one of the outgoing lines as seen in FIG. 2). … If the outgoing call is successfully connected to the telephony server (step 708), the telephony server then connects the port of the incoming call with the port of the outgoing call (step 710) to complete the end-to-end connection (step 712)." Ex. 1003 at 17:11-49; 11:40-51; Figs. 1, 3-4, and 7. In this example, receiving the "call forwarding" number and "initiat[ing] an outgoing

call … to the forwarding number" discloses "executing the control criteria to facilitate the routing of the one or more communications." Furthermore, the call may be initiated "via an outgoing telephone line" of the telephony-centric network 129. *Id.* The telephony-centric network 129, such as the PSTN, is "one of the at least two networks."

C. Ground 2: Claim 1 is Obvious over O'Neal in view of McMullin

142. In my opinion, Claim 1 would have been obvious to one of ordinary skill in the art in view of O'Neal and McMullin, as is detailed below:

1. Claim 1

143. As is discussed above with regard to Claim 1, O'Neal discloses each of the limitations of Claim 1. However, to the extent that it is argued that O'Neal does not expressly disclose "***validate and acknowledge said communications request***" as recited in Claim 1, this limitation is disclosed by McMullin.

144. In particular, McMullin discloses an "Interactive Voice Response System (IVRS) 14" that "provid[es] automatic redirection of an incoming voice telephone call from a caller …" Ex. 1005 at abstract; 5:11-16. This redirection allows the IVRS 14 to receive a call made to a subscriber, and then redirect the call "to a voice mail system at the IVRS 14 or to another destination number on the PSTN." Ex. 1005 at 8:1-4. According to McMullin, prior to the IVRS 14 accepting

a call, the IVRS 14 receives "information about the original destination of the call" (known as "Dialed Number Identification Service (DNIS)" information), and "validates the DNIS information against the subscriber records located in the customer record file 26 of the MTP 12 to ensure that the subscriber DN is a valid subscriber DN authorized to use the service." Ex. 1005 at 6:64-7:14 (emphasis added). "If the DNIS information is validated, the IVRS 14 transmits a message over the signaling channel 10A to the CO 30 acknowledging and accepting the call." *Id.* This validation and acknowledgement of a telephone call (and the DNIS information about the telephone call) of McMullin discloses "validate and acknowledge said communications request" of Claim 1.

145. It would have been obvious to one of ordinary skill in the art to modify O'Neal with McMullin to cause the telephony server 126 of the unified messaging system of O'Neal to validate the DNIS information of a telephone call against the "subscriber accounts" of O'Neal, and further cause the telephony server 126 to send a message "acknowledging and accepting the call" when the DNIS information is validated. Such a modification would allow the telephony server 126 to "ensure that the subscriber [of O'Neal] is a valid subscriber … authorized to use the service" of O'Neal, as is explained by McMullin. Ex. 1005 at 7:4-9. Specifically, it would allow the telephony server 126 to determine whether the subscriber still has an active "subscriber account[]," which would cause the

telephony server 126 to reroute the telephone call in accordance with the communication option setting in the active "subscriber account[]." Alternatively, it would allow the telephony server 126 to determine whether the subscriber has cancelled or suspended their "subscriber account[]," which would cause the telephony server 126 to not accept the telephone call at all.

146. Additionally, such a modification would lead to the predictable result of a system that could validate DNIS information for the telephone call, and send a message acknowledging and accepting the call when the DNIS information is validated. This acknowledgement would be sent to the edge switch (or other switch) connected to the telephony server 126. Ex. 1003 at Figure 1. Then the telephony server 126 would "obtain the communication option settings" for the particular subscriber, and reroute the call "in accordance with the communication options settings." Ex. 1003 at 15:14-43.

147. Also, this modification would merely involve adding the validation and acknowledgement procedure disclosed in McMullin to the telephone server 126 of O'Neal. As such, the modification would be well within the skill of a person of ordinary skill in the art. In fact, O'Neal discloses that the telephony server 126 already uses "DNIS" information for the telephone call in order to "obtain the communication option settings associated with the [subscriber's] account." Ex. 1003 at 15:23-32. Validating that DNIS information against the subscriber

accounts to determine whether the particular subscriber's account is still active would be a minor modification that could be easily accomplished by one of ordinary skill in the art.

148. As such, in my opinion, it would have been obvious to one of ordinary skill in the art to modify O'Neal with McMullin to cause the telephony server 126 of the unified messaging system of O'Neal to validate the DNIS information of a telephone call against the "subscriber accounts" of O'Neal, and further cause the telephony server 126 to send a message "acknowledging and accepting the call" when the DNIS information is validated.

D. Ground 3: Claim 20 is Obvious over O'Neal in view of Chang

149. In my opinion, Claim 20 would have been obvious to one of ordinary skill in the art in view of O'Neal and Chang, as is detailed below:

1. Claim 20

150. As is discussed above with regard to Claim 20 (*supra* [20a]-[20m]), O'Neal discloses each of the limitations of Claim 20. However, to the extent that it is argued that O'Neal does not expressly disclose "***facilitating certain of the users to sign up to become subscribers of the communication networks through the entry of user personal data through the website"*** of Claim 20, this limitation is disclosed by Chang.

151. In particular, Chang discloses a system that "enables persons surfing the web using such common technology to access a communication network ... to control their services and receive various reports relating to their services." Ex. 1004 at 7:9-12. In controlling their services, "the subscriber might change the 'forward to' number from time to time to route calls to different destinations. As another example, a subscriber might want to block calls unless they are to or from numbers on a list." Ex. 1004 at 2:54-67.

152. A subscriber can sign-up for the system of Chang using web pages of a web site: "the platform 25 could actually advertise services to new subscribers, obtain trial or purchase order subscriptions, take subscriber information and provision new services, all via the web page based Internet access. In such cases, the system executes a registration procedure to obtain the validation information for a new subscriber, and then the system conducts an interactive session with the user to select desired services." Ex. 1004 at 23:55-24:11; 20:28-21:27 (emphasis added). This sign-up procedure would involve "entry of user personal data," as it would require the entry of personal data (such as a purchaser's name, shipping address, etc.) that is needed to "purchase order subscriptions."

153. It would have been obvious to one of ordinary skill in the art modify O'Neal with Chang to cause the unified messaging system of O'Neal to allow a user to subscribe to the service over web pages of the website of the unified

messaging system. O'Neal already discloses providing a website to users. Adding user registration, a feature of commercial websites that was common by June 1999, would prevent the subscriber of O'Neal from having to sign up in a different manner (such as over the phone) and wait for their information to be added to the web site before the subscriber could ever use it. This aligns with stated goals in Chang of avoiding cumbersome requests to the local telephone company's business office, and further aligns with stated goals in O'Neal of providing a "simplified, convenient, and cost effect manner" of operation. *See* Ex. 1004 at 2:54-67 ("It is too cumbersome to require the subscriber to call the local telephone company's business office and request each and every one of the routine changes."); *see also* Ex. 1003 at 3:43-46 (discussing a desire for a "simplified, convenient, and cost effective manner" of operation).

154. Additionally, such a modification would lead to the predictable result of a system for which one could easily sign up for online.

155. This modification would merely involve adding a sign-up section to the same website that is already provided by the UMS 101 of O'Neal. This modification would be within the skill of a person of ordinary skill in the art.

156. As such, in my opinion, it would have been obvious to one of ordinary skill in the art to modify O'Neal with Chang to cause the UMS 101 of O'Neal to

allow a user to subscribe to the UMS service over web pages of the website of UMS 101, thereby disclosing these limitations of Independent Claim 20.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further 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 Title 18 of the United States Code.

Dated: 6/23/2016

Tal Lavian, Ph.D.