

IPR2024-01041, IPR2024-01042

Declaration of Henry Houh, Ph.D. Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS,
T-MOBILE USA, INC.,
AND AT&T SERVICES INC.

Petitioners,

v.

HEADWATER PARTNERS I LLC.
Patent Owner.

U.S. Patent No. 8,924,543
Title: SERVICE DESIGN CENTER FOR DEVICE ASSISTED SERVICE

Inter Partes Review No.: IPR2024-01041, IPR2024-01042

**DECLARATION OF HENRY HOUH, Ph.D., UNDER 37 C.F.R. § 1.68 IN
SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S.
PATENT NO. 8,924,543**

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- a) Claim 1 61
- i. [1.0] A network service plan provisioning system communicatively coupled to a wireless end-user device over a wireless access network, the network service plan provisioning system comprising one or more network elements configured to: 61
- ii. [1.1] obtain and store a first service plan component and a second service plan component,.....62
- iii. [1.2] the first service plan component comprising (1) information specifying a first traffic classification filter for filtering a traffic event in a network traffic inspection system, the traffic event being associated with the wireless end-user device and (2) a first network policy enforcement action that is triggered in a network policy enforcement system when the traffic event possesses a characteristic that matches the first traffic classification filter, and the second service plan component comprising (a) information specifying a second traffic classification filter for filtering the traffic event in the network traffic inspection system, and (b) a second network policy enforcement action that is triggered in the

- network policy enforcement system when the traffic event
possesses a characteristic that matches the second traffic
classification filter;.....65
- iv. [1.3] process the first service plan component and the second
service plan component to create a network provisioning
instruction set in accordance with a prioritization of the first traffic
classification filter over the second traffic classification filter, the
network provisioning instruction set comprising one or more traffic
inspection provisioning instructions for the network traffic
inspection system and one or more policy enforcement
provisioning instructions for the network policy enforcement
system, the network traffic inspection system and the network
policy enforcement system implementing one or more policies
applicable to the wireless end-user device;.....72
- v. [1.4] provide the one or more traffic inspection provisioning
instructions to the network traffic inspection system; and 79
- vi. [1.5] provide the one or more policy enforcement provisioning
instructions to the network policy enforcement system.....80

b) Claim 2 The network service plan provisioning system of claim 1, wherein process the first service plan component and the second service plan component to create a network provisioning instruction set in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter comprises order traffic inspection comparison operations in the one or more traffic inspection provisioning instructions such that the one or more traffic inspection provisioning instructions direct the network traffic inspection system to determine whether the traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter. 81

c) Claim 3 The wireless end-user device of claim 2, wherein the one or more processors are further configured to override the selective denial of one or more Internet service activities by or on behalf of the particular application when the user has augmented the differential traffic control policy so as to indicate that Internet

service activities are allowable when the classified wireless network is the WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground. ...85

d) Claim 4 The network service plan provisioning system of claim 2, wherein process the first service plan component and the second service plan component to create a network provisioning instruction set in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter further comprises include in the network provisioning instruction set one or more instructions directing the network traffic inspection system to determine whether the traffic event also possesses the characteristic that matches the second traffic classification filter if the traffic event possesses the characteristic that matches the first traffic classification filter. 86

e) Claim 5 [5.0] The network service plan provisioning system of claim 1, further comprising: 88

vii. [5.1] a policy enforcement priority rule datastore including a policy enforcement priority rule for determining whether the traffic event

possesses the characteristic that matches the first traffic
classification filter before determining whether the traffic event
possesses the characteristic that matches the second traffic
classification filter, ...88

viii. [5.2] and wherein process the first service plan component and the
second service plan component to create a network provisioning
instruction set in accordance with a prioritization of the first traffic
classification filter over the second traffic classification filter
comprises include the policy enforcement priority rule in the
network provisioning instruction set.....88

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claim 5, wherein the policy enforcement priority rule comprises a
priority order for a plurality of traffic classification filters, the
plurality of traffic classification filters including the first traffic
classification filter and the second traffic classification filter.....92

g) Claim 7 The network service plan provisioning system of
claim 5, wherein the policy enforcement priority rule comprises a

priority specification for one or both of the first service plan
component and the second service plan component.....92

h) Claim 11 The network service plan provisioning system of
claim 5, wherein the one or more network elements are further
configured to provide a user interface for a service plan design
environment that provides for entering the policy enforcement
priority rule in the design environment by entering a priority
assignment for the first service plan component, entering a priority
assignment for the second service plan component, positioning the
first and second service plan components in a priority ordering,
defining the first or second service plan component as belonging to a
service type that has an implied or literal ordering, or a combination
of these.....92

i) Claim 12 The network service plan provisioning system of
claim 1, wherein the information specifying the first traffic
classification filter comprises an inspection criterion selected from a
group of inspection criteria consisting of: a specific device
application, a specific network destination, a specific network

source, a specific traffic type, a specific content type, a specific
traffic protocol, and a combination of two or more of the inspection
criteria. 95

j) Claim 13 The network service plan provisioning system of
claim 1, wherein the first or second policy enforcement action is an
action selected from a group of actions consisting of: apply a traffic
control policy; apply a service usage accounting, charging, or billing
policy; apply a service notification policy; and a combination of two
or more of the actions. 96

k) Claim 22 The network service plan provisioning system of
claim 1, wherein the first service plan component further comprises
an additional policy enforcement action to augment the first policy
enforcement action, and wherein the second service plan component
further comprises the additional policy enforcement action to
augment the second policy enforcement action.....96

l) Claim 23 The network service plan provisioning system of
claim 1, wherein the first service plan component further comprises
an additional policy enforcement action to over-ride the first policy

enforcement action, and wherein the second service plan component
further comprises the additional policy enforcement action to over-
ride the second policy enforcement action. 97

m) Claims 30-33, and 35-41 99

n) Claim 90 The network service plan provisioning system of
claim 1, wherein the traffic event is associated with a particular
destination, a particular application on the wireless end-user device,
a content type, a protocol, a port, or an operating system of the
wireless end-user device. 101

o) Claim 91 The network service plan provisioning system of
claim 1, wherein the traffic event is associated with a specified
remote destination, a specified application, a specified operating
system, a specified content, a specified protocol, or a specified port
number. 103

p) Claim 92 The network service plan provisioning system of
claim 91, wherein the specified remote destination is identified by a
domain or an Internet protocol (IP) address. 103

q) Claim 93 The network service plan provisioning system of
claim 91, wherein the specified application is identified by a name, a
hash, a certificate, or a signature. 103

r) Claim 112 The network service plan provisioning system of
claim 1, wherein the information specifying the first traffic
classification filter or the information specifying the second traffic
classification filter comprises a name, a description, a filtering
parameter, a launch mechanism, or a combination of these.....104

s) Claim 113 The network service plan provisioning system of
claim 112, wherein the filter parameter specifies filtering the traffic
event by destination, by application, by operating system, by
protocol, or by port. 104

B. Ground 2: Claims 8-10, 15, 21, 28, 42, 43, 45, 46, 87-89, 96, 98-99, and
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claim 1, wherein at least one of the one or more policies is
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u) Claim 9 The network service plan provisioning system of claim 8, wherein the network state comprises a congestion state of the wireless access network, a network location, a type of the wireless access network, whether the wireless access network is a roaming network, a routing identifier associated with the wireless access network, or a combination of these. 106

v) Claim 10 The network service plan provisioning system of claim 9, wherein the congestion state is based on a time of day, a measure of network congestion, a measure of a delay, a measure of a jitter, a packet error rate, or a combination of these. 107

w) Claim 15 The network service plan provisioning system of claim 1, wherein the one or more network elements are further configured to include in the network provisioning instruction set an instruction to assist in enforcing a classification-based charging policy, wherein the classification is selected from the group of classification categories consisting of: application, destination, network, time of day, congestion state, quality of service, content

type, and a combination of two or more of the classification
categories. 108

x) Claim 21 The network service plan provisioning system of
claim 1, wherein the one or more network elements are further
configured to facilitate reuse of the first service plan component, the
second service plan component, the first traffic classification filter,
the second traffic classification filter, the first policy enforcement
action, or the second policy enforcement action in a plurality of
service plans by storing the first service plan component, the second
service plan component, the first traffic classification filter, the
second traffic classification filter, the first policy enforcement
action, and the second policy enforcement action as one or more
objects in a catalog.....109

y) Claim 28 The network service plan provisioning system of
claim 1, wherein the one or more network elements are further
configured to obtain service plan parameters for multiple service
plans, combine one or more service policies for the multiple service
plans into one composite-plan policy set, and provision the network

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dd) Claim 87 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a traffic control policy. 114

ee) Claim 88 The network service plan provisioning system of claim 87, wherein the control policy specifies to allow, block, throttle, delay, or defer the traffic event. 115

ff) Claim 89 The network service plan provisioning system of claim 87, wherein the traffic control policy is based on a network state, a device state, a service-plan-usage state, or a combination of these. 115

gg) Claim 96 The network service plan provisioning system of claim 1, wherein the first service plan component or the second service plan component comprises a carrier component, a network protection component, an application component, a sponsored component, a subscriber-paid component, a marketing interceptor component, a parental control component, a bulk component, a post-bulk component, or an end-of-life component. 115

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associated a web page, a domain, an application, a roaming network,
an e-mail service, a networking service, a music download service, a
video game service, a multimedia service, or a combination of these.

C. Ground 3: Claims 16, 44, 47, 57-66, 68-72, 80 and 85-86 Are Obvious Over Poh in view of Maes in further view of Burnett.	119
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assisting to specify or identify a notification content, a notification
trigger, or a notification offer; and 129

determine at least a portion of the policy enforcement provisioning
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rr) Claim 60 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a notification policy. 130

ss) Claim 61 The network service plan provisioning system of claim 60, wherein the one or more policy enforcement provisioning instructions assist in causing a notification to be delivered to a subscriber or to the wireless end-user device. 130

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acknowledgment of the notification, a request for information, or a
request to make a purchase. 133

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eee) Claim 85 The network service plan provisioning system of
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Petitioner's Exhibit List

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 8,924,543 (“the ’543 Patent”)
1002	Select portions of prosecution history of the ’543 Patent (“File History”)
1003	Declaration of Petitioner’s Expert Henry Houh
1004	U.S. Pat. No. 9,712,331 (“Poh”)
1005	U.S. Pat. Pub. No. 2008/0181208 (“Maes”)
1006	Boutaba and Polyraakis, “Toward Extensible Policy Enforcement Points”, in M. Sloman, J. Lobo, and E. Lupu (Eds.): POLICY 2001, LNCS 1995, pp. 247-261 (© Springer-Verlag Berlin Heidelberg 2001)
1007	Beigi et al., “Policy Transformation Techniques in Policy-based Systems Management”, Proceedings Fifth IEEE International Workshop on Policies for Distributed Systems and Networks (2004)
1008	Chaouchi et al., “Policy Based Networking in Integration Effort of 4G Networks and Services”, 2004 IEEE 59 th Vehicular Technology Conference, VTC 2004-Spring, pp. 2977-2981 Vol. 5.
1009	Verma et al., “Simplifying Network Administration Using Policy-Based Management”, IEEE Network, pp. 20-26 (March/April 20).
1010	3GPP TS 23.203 (v8.4.0 (2008-12) (3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Policy and charging control architecture (Release 8))
1011	U.S. Pat. No. 8,032,920 (“Maes II”)

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<i>Exhibit #</i>	<i>Description</i>
1012	U.S. Pat. No. 9,691,082 (“Burnett”)
1013	List of related patents

Declaration of Henry Houh, Ph.D. Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

I, Henry Houh, Ph.D. hereby declare as follows:

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of Celco Partnership d/b/a Verizon Wireless, T-Mobile USA, Inc., and AT&T Services Inc. (collectively, “Petitioners”) for the above-captioned Petition(s) for *Inter Partes* Review (“IPR”) of claims 1-13, 15, 16, 21-23, 28, 30-33, 35-47, 57-66, 68-72, 80, 85-93, 96, 98-99, 112-113 and 120-121 of U.S. Patent No. 8,924,543 (“the ‘543 patent”) (the Challenged Claims). I am being compensated for my time in connection with this IPR at my standard consulting rate of \$820 per hour. My compensation is in no way dependent on the outcome of this matter.
2. I have been asked to provide my opinions regarding whether the Challenged Claims are unpatentable as obvious. In preparing this declaration, I have reviewed the ‘543 patent, the file history of the ‘543 patent, and numerous prior art references from the time of the alleged invention. I have also considered certain materials from IPR proceedings that were based on

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petitions filed by other companies for patents that are related to the ‘543 patent.

3. In forming the opinions expressed in this declaration, I relied upon my education and experience in the relevant field of the art, and have considered the viewpoint of a person having ordinary skill in the relevant art, as of the Priority Date identified below.
4. I understand that ‘543 claims priority through several applications with the earliest filed on January 28, 2009 (“Priority Date”). My analysis as set forth below uses that date as the Priority Date of the ‘543 patent and the Challenged Claims but I have not done any analysis to confirm whether the Challenged Claims have support in the earlier applications.
5. My opinions directed to the unpatentability of the challenged claims are based, at least in part, on the following prior art publications:

Reference	Date of Public Availability
U.S. Pat. No. 9,712,331 (“Poh”)	Poh issued on July 18, 2017 from an application filed on August 20, 2008

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	("Poh") (EX-1004). Poh is prior art under at least the pre-AIA version of 35 U.S.C. § 102(a), (e), and (g).
U.S. Pat. Pub. No. 2008/0181208 ("Maes")	Maes published on July 31, 2008 from an application filed on January 30, 2007 ("Maes") (EX-1005). Maes is prior art under at least pre-AIA version of 35 U.S.C. § 102(a), (e), and (g). Maes is attached as Exhibit 1005 to the IPR. Maes issued as U.S. Pat. No. 8,117,335.
U.S. Pat. No. 8,032,920 ("Maes II")	Maes II issued on October 4, 2011 from an application filed on December 27, 2004 ("Maes II") (EX-1011). Maes II is prior art under at least pre-AIA version of 35 U.S.C. § 102(a), (e) and (g). Maes II published as US 2006/0143686 on June 29, 2006 and

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	thus is prior art under § 102(b)
U.S. Pat. No. 9,691,082 (“Burnett”)	Burnett issued on June 27, 2017 from an application filed on March 19, 2008 (“Burnett”) (EX-1012). Burnett is prior art under at least pre-AIA version of 35 U.S.C. § 102(a), (e) and (g).

II. BACKGROUND AND QUALIFICATIONS

6. My background and expertise that qualify me as an expert in the technical issues in this case are as follows:
7. As indicated on my *Curriculum Vitae* attached as **Exhibit A**, I received a Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (“MIT”) in 1998. I also received a Master of Science degree in Electrical Engineering and Computer Science in 1991, a Bachelor of Science Degree in Electrical Engineering and Computer Science in 1989, and a Bachelor of Science Degree in Physics in 1990, all from MIT.

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8. During my college studies, I focused on communications and data networking. I took specialized courses including graduate courses in telecommunications networks, optical communications, and data networking. I, along with other graduate students in a networking research group, maintained both the computer workstations and the networking devices in the research group.
9. I also served as a teaching assistant for the Computation Structures core course a number of times. At the time, the course involved teaching computer architecture at a low level, and the laboratory component involved building a CPU from discrete components at the gate level and higher. When I was enrolled in this course as an undergraduate student, I redesigned the hardware and software, including microcode and nanocode of this CPU, to achieve an average speed up of roughly thirty times. Based in part on this, I became a laboratory assistant, head laboratory assistant, and then a teaching assistant in my second term senior year, which is unusual in that teaching assistantships at MIT are normally reserved for graduate students. I further became head teaching assistant and also taught some recitation sections.

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10. As part of my doctoral research at MIT from 1991-1998, I worked as a research assistant in the Telemedia Network Systems (“TNS”) group at the Laboratory for Computer Science. The TNS group built a high-speed gigabit ATM network and applications which ran over the network, such as remote video capture (including audio), processing and display on computer terminals. In addition to helping design the core network components (such as the ATM switch), designing and building the high-speed ATM links, and designing and writing the device drivers for the interface cards, I also set up the group’s web server, which at the time was one of the first several hundred web servers in existence. I used programmable logic devices, such as programmable array logic and field programmable gate arrays, and their software development environments, in the design of these components. Our high-speed data network carried multimedia data including video and audio data within ATM cells.

11. The TNS group was the first group to initiate a remote video display over the World Wide Web. Vice President Al Gore visited our group in 1996 and received a demonstration of—and remotely drove—a radio-controlled toy car with a wireless video camera mounted on it; the video was encoded

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by TNS-designed hardware, streamed over the TNS-designed network and displayed using TNS-designed software. During this time, I also modified a web server to determine the location of client, and present different web pages depending on location.

12.I authored or co-authored twelve papers and conference presentations on our group's research. I also co-edited the final report of the gigabit networking research effort with Professor David Tennenhouse and Senior Research Scientist David Clark. David Clark is generally considered to be one of the fathers of the Internet Protocol and served as Chief Protocol Architect for the Internet. With its focus on networking, the group, including myself, set up and maintained the network and computer systems. These systems included the networking on the workstations and desktops, the distributed file system, desktops and workstations, setting up and maintaining the distributed file system (Network File System) and the authentication system (Network Information Service, formerly known as Yellow Pages). Our system allowed users to log into any of the group's workstations using their username/password, which allowed that all of the

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user's files would be virtually mounted on that workstation as a networked home directory.

13.I defended and submitted my Ph.D. thesis, titled "Designing Networks for Tomorrow's Traffic," in January 1998. As part of my thesis research, I analyzed local-area and wide-area flows to show a more efficient method for routing packets in a network, based on traffic patterns at the time. My thesis also addressed real-time streamed audio and video. The network traffic that I analyzed was IP protocol traffic, including UDP and TCP.

14.I have been involved in Voice over Internet Protocol ("VoIP") technologies since 1997 and have specific experience in designing and testing VoIP networks.

15.From 1997 to 1999, I worked at NBX Corporation, which was acquired by 3Com Corporation in 1999. During this time, I was a Senior Scientist and Engineer working in IP Telephony. NBX delivered the world's first fully featured business telephone system to run over a data network, the NBX100. NBX was one of the first business phone systems to be configurable via a web interface. Users and administrators had access to varying levels of configuration for the phone system.

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16. As part of my work at NBX, I designed the core audio reconstruction algorithms for the telephones which depacketized the voice data and reconstructed the audio. In addition, I designed the voice data packet transmission algorithms. I created a system to capture and analyze network packets sent by devices in the NBX system for aid in testing and debugging. I also designed and validated the core packet transport protocol used by the phone system. In addition, I designed and oversaw the development of the underlying transport protocol used by the NBX100 phone system for reliable packet transport. That transport protocol is still used by the NBX100 system and its successors and is estimated to be used hundreds of millions of times daily. I wrote NBX's first demonstration IP software stack, which added the capability for utilizing the NBX100 phone system on an IP network. NBX first demonstrated a phone in the NBX100 system working over the Internet in 1998 at a trade show in Las Vegas. I was later the lead architect in designing NBX's next-generation highly scalable system, and, after NBX was acquired by 3Com, I did some work with 3Com's cable equipment division, including demonstrating a working NBX IP phone system over 3Com's cable equipment infrastructure using an early

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version of DOCSIS at a trade show in 1999. The NBX100 was the market's leading business phone system to run on a data network for several years following its introduction. During that time, I became more familiar with the various standards relevant to Internet telephony as well as the problems which designers of commercial telephony operations were faced with in implementing VoIP.

17.I, along with two of NBX's founders, was awarded U.S. Patent No. 6,697,963 titled "Telecommunication method for ensuring on-time delivery of packets containing time-sensitive data," for some of the work we did while at NBX.

18.After NBX, I worked at Teradyne, a test tool company primarily focused on semiconductors. Teradyne had recently acquired Hammer, a company that specialized in load and functional testing for telecommunications systems. The Hammer product is well known as a telecom test tool. Teradyne spun out Hammer and several other internal divisions into an independent company called Empirix. I became Chief Technologist of the Hammer division of Empirix. Empirix was a leader in VoIP network testing and monitoring.

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19. At Empirix, I laid out a new multi-year product vision for data network testing, secured internal funding for the effort, and led a team to deliver a new technology platform to the market in February 2001. This new product, PacketSphere, initially emulated network behavior so that wide-area VoIP connections could be tested in a lab. A later release allowed PacketSphere to generate high volumes of VoIP calls, including media streams, and to monitor the quality of VoIP voice streams. Later, the core technology was added to other Empirix products such as Empirix's Hammer XMS to monitor thousands of VoIP media streams in real time to determine their quality. PacketSphere was Empirix's most successful new platform introduction. Companies purchased the PacketSphere product to emulate an Internet Protocol network to see the effects of deploying their product on the Internet prior to launch. PacketSphere received several industry awards.
20. During my time at Empirix, I presented lectures on VoIP and data network testing to companies including Lucent Labs (formerly AT&T Bell Labs). I was also invited to present several guest lectures in a software engineering course at MIT. Since then, I have also participated twice as a unit lecturer (two weeks) in an experimental course that was taught by an Institute

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Professor (the highest award that a MIT Professor can achieve) and sponsored by the Chairman of the MIT Corporation (MIT's board of trustees).

21. From 2004 to 2008, I was employed by BBN Technologies Corp., a technology research and development company located in Cambridge, Massachusetts. BBN Technologies is a world-renowned company with expertise in acoustics, speech recognition, and communications technology. BBN Technologies staff have pioneered many internetworking technologies and Internet applications, and built some of the world's largest government and commercial data networks.

22. My duties and responsibilities at BBN Technologies generally included commercialization of the technologies developed by BBN Technologies, which included spinning off companies and growing commercial businesses in-house. More particularly, I was involved in utilizing the award-winning AVOKE STX speech recognition technology to create the public audio/video search engine EveryZing (formerly known as PodZinger) which was spun out into a stand-alone company now known as RAMP, Inc. PodZinger won the 2006 MITX Technology Award for best Web 2.0

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Application and was also named the 2006 Forbes Favorite Video & Audio Search Engine, beating out Google, Yahoo, and other companies. After managing the creation of the initial prototype system, PodZinger built out a full streaming audio and video search solution when I was the Vice President of Operations and Technology there. I was also involved in the Boomerang Mobile Shooter Detection project as the Vice President of Engineering for the program. The Boomerang system was deployed to Iraq and Afghanistan, and was credited with saving many lives.

23. From 1989 to 1990, I worked at AT&T Bell Laboratories on optical computers. This work generated six peer-reviewed papers, and multiple U.S. and European patent applications in which I was named as a co-author or inventor. I also interned at AT&T Bell Laboratories in 1987 and 1988. Additional relevant experience in the field of optical computers is listed in my *Curriculum Vitae*.

24. I am a named inventor on several patents and published patent applications that are related to the VoIP technology including: U.S. Patent No. 6,967,963, entitled “Telecommunication Method for Ensuring On-time Delivery of Packets Containing Time- Sensitive Data”; U.S. Patent

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Application Publication No. 20020015387, entitled “Voice Traffic Packet Capture and Analysis Tool for a Data Network”; U.S. Patent Application Publication No. 20020016708, entitled “Method and Apparatus for Utilizing a Network Processor as Part of a Test System”; U.S. Patent Application Publication No. 20020016937, entitled “Method and Apparatus for Utilizing a Network Processor as Part of a Test System”; and U.S. Patent No. 7,590,542, entitled “Method of Generating Test Scripts Using a Voice-Capable Markup Language.”

25.[This paragraph left intentionally blank].

III. MATERIALS CONSIDERED FOR THIS DECLARATION

26.In addition to my general knowledge, education, and experience, I have considered all of the materials referenced in my declaration as well as the materials listed in **Exhibit B** in forming my opinions.

IV. SUMMARY OF OPINIONS

27.Based on my review of the ‘543 patent and its prosecution history, the other materials I have considered, and my knowledge and experience, my

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opinions are as follows. The prior art renders the claims obvious for the
‘543 patent as identified below.

28. In my analysis herein, I have considered the various disclosures (e.g., the
‘543 patent, the prior art, ...) from the view of a person of ordinary skill in
the art (“POSA”) at the time of the invention, which I have identified as the
“Priority Date” herein.

29. I have presented my opinion below regarding the challenged claims based
on the following grounds. I note that these grounds have been split up in the
Petitions with which my Declaration is filed:

Ground	Claims	Basis	Reference
1	1, 2-7, 11-14, 22- 23, 30-33, 35-41, 90-93, and 112-113	§ 103	Poh, alone, or in view of Maes
2	1, 8-10, 15, 21, 28, 42, 43, 45, 46, 87- 89, 96, 98-99, 120- 121	§ 103	Poh, alone, or in view of Maes

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	16, 44, 47, 57-66, 68-72, 80 and 85-86	§ 103	Poh, alone, or in view of Maes, in further view of Burnett
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30.[This paragraph left intentionally blank].

**V. OVERVIEW OF THE ‘543 PATENT AND ITS PROSECUTION
HISTORY**

A. Overview of the ‘543 Patent.

31. The application that became the ‘543 patent (13/248,025) was filed on September 28, 2011. That application claims priority to numerous prior applications and provision applications that are recited on the first four pages of the ‘543 patent. The earliest of these filings is dated January 28, 2009.

32. At a high level, the ‘543 patent is generally directed to “modular storage of network service plan components and provisioning of same. A subset of the capabilities of a service design system can be granted to a sandbox system to enable customization of service plan offerings or other controls.” EX-1001 Abstract.

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33. The “Background of The Invention” states: “Today, end user devices (such as a mobile phone, tablet computer, or notebook computer) sign up for one or more mutually exclusive service plans (e.g., text messages, voice, or data) before being allowed to use an access network. The service plans usually are either pre-paid or post-pay. Depending on which service plans a user subscribes, a cost of using the access network can vary. The access network determines whether the requested use is for the mutually exclusive categories of text messages, voice, or data. Once the appropriate service plan is determined, the access network can use a policy of the service plan to determine the cost for the use. However, a user is limited to selecting one service plan from each of these three mutually exclusive categories, and thus the user is limited in selecting how he/she wants to use the access network. For example, a user cannot select multiple data plans for various data services to customize an end user device's use of the access network. The configuration of the access network to implement a particular service plan is also very difficult. For example, to create a service plan for data services, employees of the carrier that operate the access network will discuss basic attributes of the plan (e.g., whether to charge by MB or to be

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unlimited), and the cost of the plan. Then, an employee will enter into a network device the policy to track use of the access network (e.g., if the former is chosen) for end user devices that subscribe to the particular data plan. An employee also enters a policy into another network device for allowing end user devices that subscribe to the data plan to use the access network. This cumbersome process makes the design of the service plan rigid, time-consuming, and prone to errors, thereby taking a long time to complete and have users begin selecting the data plan for their data services.” EX-1001 7:28-8:2.

34.The ‘543 Title is “Service design center for device assisted services.”

35.As issued, the ‘543 patent includes 121 claims with 1 independent (claim 1) and 120 dependent claims. I have been asked to opine on the Challenged Claims in my analysis. For brevity, I have only recited claim 1 (the only independent claim) below:

1. A network service plan provisioning system communicatively coupled to a wireless end-user device over a wireless access network, the network service plan provisioning system comprising one or more network elements configured to:

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obtain and store a first service plan component and a second
service plan component,

the first service plan component comprising

(1) information specifying a first traffic classification filter for
filtering a traffic event in a network traffic inspection system,

the traffic event being associated with the wireless end-user
device and

(2) a first network policy enforcement action that is triggered in

a network policy enforcement system when the traffic event

possesses a characteristic that matches the first traffic

classification filter,

and the second service plan component comprising

(a) information specifying a second traffic classification

filter for filtering the traffic event in the network traffic

inspection system, and

(b) a second network policy enforcement action that is

triggered in the network policy enforcement system when

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the traffic event possesses a characteristic that matches
the second traffic classification filter;
process the first service plan component and the second service
plan component to create a network provisioning instruction set
in accordance with a prioritization of the first traffic
classification filter over the second traffic classification filter,
the network provisioning instruction set comprising
one or more traffic inspection provisioning instructions
for the network traffic inspection system and one or more
policy enforcement provisioning instructions for the
network policy enforcement system, the network traffic
inspection system and the network policy enforcement
system implementing one or more policies applicable to
the wireless end-user device;
provide the one or more traffic inspection provisioning
instructions to the network traffic inspection system; and
provide the one or more policy enforcement provisioning
instructions to the network policy enforcement system.

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36.[This paragraph left intentionally blank].

B. Overview of the Prosecution History of the ‘543 Patent

37.I have reviewed the prosecution history of the ‘543 patent in forming my
opinions for purposes of this declaration.

38.As filed on September 28, 2011, the initially filed claims were different
from those that issued.

39.On December 11, 2012, the Examiner issued an Office Action that imposed
a restriction requirement.

40.On February 19, 2013, the Applicant traversed the restriction requirement,
amended claim 1 substantially and added 95 new claims.

41.On May 16, 2013, the examiner then issued a notice of allowance for all
121 claims without applying or discussing any prior art.

42.The applicant then subsequently appeared to repeatedly submit additional
prior art references after the allowance. Ultimately, after several
interactions, another Notice of Allowance was issued on November 24,
2014.

43.[This paragraph left intentionally blank].

VI. Level Of Ordinary Skill In The Art

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44.I have been advised that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including the educational level of active workers in the field at the time of the invention, the sophistication of the technology, the type of problems encountered in the art, and the prior art solutions to those problems.

45.It is my opinion that a person having ordinary skill in the relevant art (“POSA”) at the time of the invention would have been familiar with designing rules for implementing policies for service plans for use of an access network and provisioning those rules to network elements for policy enforcement, as demonstrated by the prior art references and description in the State of the Art below.

46.A POSA would have gained knowledge of these concepts through a mixture of training and work experience, such as by having a Bachelor’s degree in computer science and two years of experience; or by obtaining a Master’s degree in computer science, but having only one year of experience.

47.[This paragraph left intentionally blank].

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VII. CLAIM CONSTRUCTION

48.I understand that the parties in the related litigations have not exchanged
proposed claim constructions or submitted claim construction briefing to
the Court.

49.The prior art discussed below discloses the claim elements under any
reasonable construction of the terms.

50.[This paragraph left intentionally blank].

VIII. UNDERSTANDING OF THE LAW

51.In expressing my opinions and considering the subject matter of the claims
of the ‘543 patent, I am relying upon certain basic legal principles that have
been explained to me. I have been informed by counsel that a patent claim
is unpatentable as anticipated under 35 U.S.C. § 102 if each element of that
claim is present either expressly or inherently in a single prior art reference.
I have also been informed that, to be an inherent disclosure, the prior art
reference must necessarily disclose the limitation, and the fact that the
reference might possibly practice or contain a claimed limitation is
insufficient to establish that the reference inherently teaches the limitation.

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52.I have been informed that a claimed invention is unpatentable under 35 U.S.C. § 103, if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

53.I have been informed by counsel that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include the following: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to obtain predictable results; (c) use of a known technique to improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable

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expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

54.Finally, I understand that secondary factors may be considered in an obviousness inquiry. I understand that these are also referred to as secondary considerations and may include evidence of long-felt need, failure of others, skepticism of those of skill in the art, licensing, commercial success, recognition in the industry, acquiescence, evidence of copying, and unexpected results. While these secondary considerations must be taken into account, they do not necessarily control the obviousness determination.

55.Moreover, for objective evidence of nonobviousness to be accorded substantial weight, I understand that the proponent of such evidence must establish a “nexus” between the evidence and the merits of the patent at issue. Specifically, I understand that the secondary consideration must be tied to the merits of the claimed invention of the patent at issue. Where the alleged secondary consideration results from something other than what is

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both claimed and novel, I understand that there is no nexus to the merits of the claimed invention and the secondary considerations are thus not indicative of nonobviousness. I also understand that it is the patentee's burden to come forward with evidence that a nexus exists.

56.[This paragraph left intentionally blank].

IX. SCOPE AND CONTENT OF THE PRIOR ART

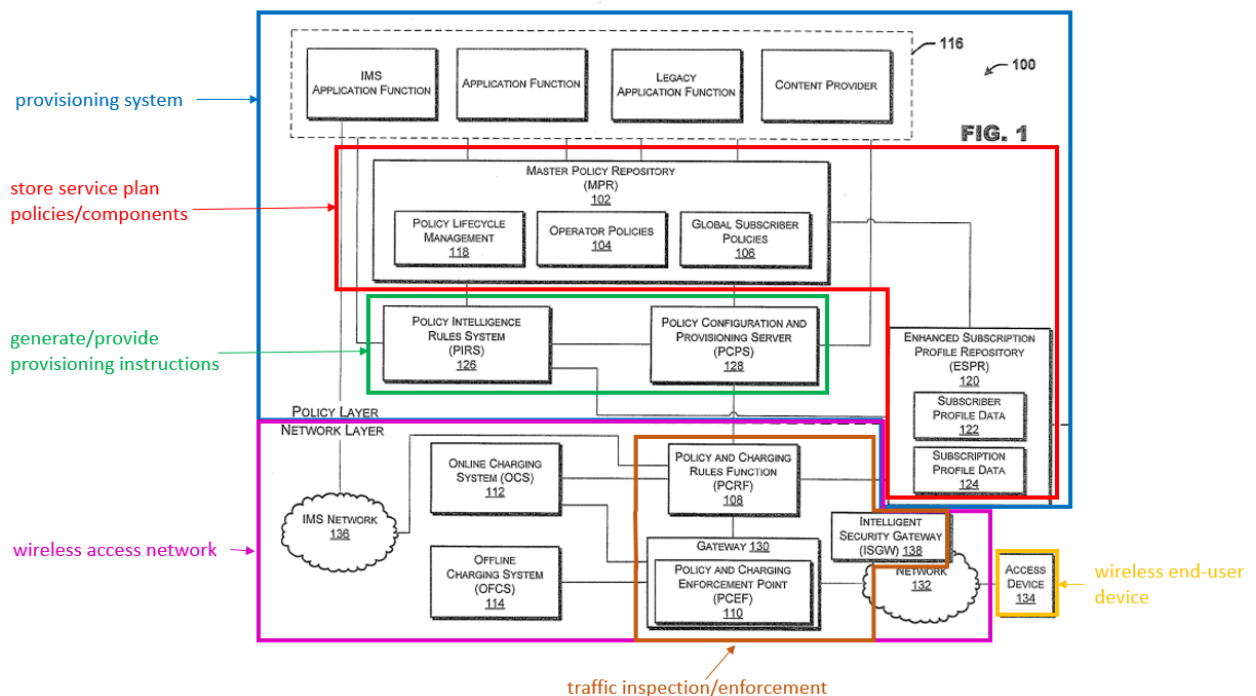
A. Poh (EX-1004).

57.Poh teaches “Various systems and methods for providing a policy realization framework for a communications network are disclosed. The policy realization framework can be an application and service layer policy framework that is separate and distinct from the network layer policy framework. As such, policy decisions can be made remote from the network layer, and common policies across multiple networks are possible. Methods and systems for providing these and other features are disclosed. A policy intelligence rules system for a policy realization framework, and methods of implementing a policy intelligence rules system, are also disclosed” EX-1004 Abstract.

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1. Provisioning Architecture

58. Like the '543 Patent, Poh teaches a policy configuration and provisioning system for a communication network. Poh's FIG. 1 discloses a policy realization framework reflecting the architecture:



59. EX-1004 3:7-46, 10:22-25, 10:28-30, 16:4-14, FIGS. 1, 3.

60. Poh's policy realization framework is divided into two logical layers, a policy layer (blue) and a network layer (pink). The policy layer handles

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policy management, rule generation for implementing policies and provisioning of the network layer with generated rules:

[T]he policy layer includes application and service policy management systems and network policy management systems. The policy layer can store, organize, determine, and apply policy rules to services requested by subscribers or other entities, as will be explained in more detail below. The policy layer can provide common policy rules across services and applications, and policy rule management. The policy layer can dynamically determine rules based upon operator policies, network policies, subscriber specific policies, subscription specific policies, subscriber profile data, subscription profile data, and/or subscriber preferences, for example. The policy layer can also generate instructions or commands for driving elements in the network layer to grant, restrict, and/or deny requested services. Rules can be determined online, i.e., during a service or application session, and in real-time or near real-time. Additionally, or alternatively, the policy rules can be determined offline, i.e., not during a service or application session.

61.EX-1004 11:9-33.

62.Poh's policy layer includes a Master Policy Repository (MPR) (red) that receives, retrieves, accesses, organizes, and/or manages operator policies and global subscriber policies. Operator policies include policies for gating

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control, data throttling, packet inspection, security, privacy, emergency, charging, application-specific, global application, service-specific, global service, content provider, legacy, and the like. Policies are enforced in the network layer by a policy and charging rules function (PCRF) (brown), a policy and charging enforcement point (PCEF) (brown), a wireless application protocol (WAP) gateway (not shown), deep packet inspection (DPI) points (not shown), and/or other enforcement points that require service rules to ensure consistent enforcement by the network. EX-1004 11:53-12:8.

63.Global subscriber policies include policies global to all subscribers and applied to one or more applications / services that are accessible to the operator's subscribers. Global subscriber policies can be defined for each service or application, such as a service aware roaming control policy that can prevent a subscriber from accessing operator-defined services or applications while roaming. EX-1004 12:23-31.

64.Poh's MPR is fed by an Enhanced Subscription Profile Repository (ESPR) (red) that stores subscriber and subscription profile data. Data stored in the ESPR can be stored locally in the MPR. Subscriber profile data includes

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subscriber specific data related to service entitlement, service prohibition, and other subscriber profile data for policy rule generation and service enforcement. The subscriber profile data can include policy-related data, such as rate plan, rate plan categories, service entitlement for rate plan or rate plan categories, preemption priorities for differential charging or treatment types, and service related roaming entitlement. Subscriber profile data can also include payment type information, class of service (CoS) entitlement for messaging, such as short message service (SMS) and multimedia message service (MMS) messaging, as well as other network services. EX-1004 12:61-13:26.

65. Poh's subscription profile data can include all available service plans offered by an operator, including various categories, such as data rate plans for standalone or integrated network cards for use in computer systems (e.g., laptop computers), data rate plans with voice plan add-ons, data rate plans combined with voice plans, international voice plans, international data plans, pooled plans, government plans, WiFi add-on plans, device-specific plans, push email plans, business plans, media bundles, global

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positioning system (GPS) plans, any combination thereof, and the like. EX-1004 13:38-49.

66.Poh's provisioning system processes the policies from the MPR using Policy Intelligence Rules System (PIRS) (green) to translate policies into rules in the form of executable instructions, which are sent from Policy Configuration and Provisioning Server (PCPS) (green) for use by network elements such as PCRF, PCEF, and/or Intelligent Security Gateway (ISGW) (brown) in a wireless access network (pink) servicing wireless end user devices (gold). EX-1004 13:60-14:2.

67.Poh's access network (pink) provides devices (gold) access to services and applications provided by the application functions (AF's) via wireless access technologies. Devices can include handheld devices such as an information appliance, a smartphone, a personal digital assistant (PDA), a mobile phone, a personal communicator, and a handheld game console; other mobile devices such as laptop computers; stationary devices such as desktop computers, servers, and the like; and various other telephony devices. EX-1004 14:64-15:7.

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2. Policy Processing into Rules Instructions

68. Poh's PIRS (i) takes operator and global subscriber policies from the MPR, and subscriber and subscription profile data from the ESPR, (ii) identifies policy conflicts and resolves conflicts (a form of prioritization), and (iii) determines applicable rules to be sent to Poh's PCPS, which sends those rules (in the form of executable instructions) to configure the network layer for rule decision and enforcement operations. EX-1004 11:26-28, 13:64-14:2; 15:60-16:2, 16:61-65, 18:41-44.

69. Fig. 7 shows the operation of the PIRS:

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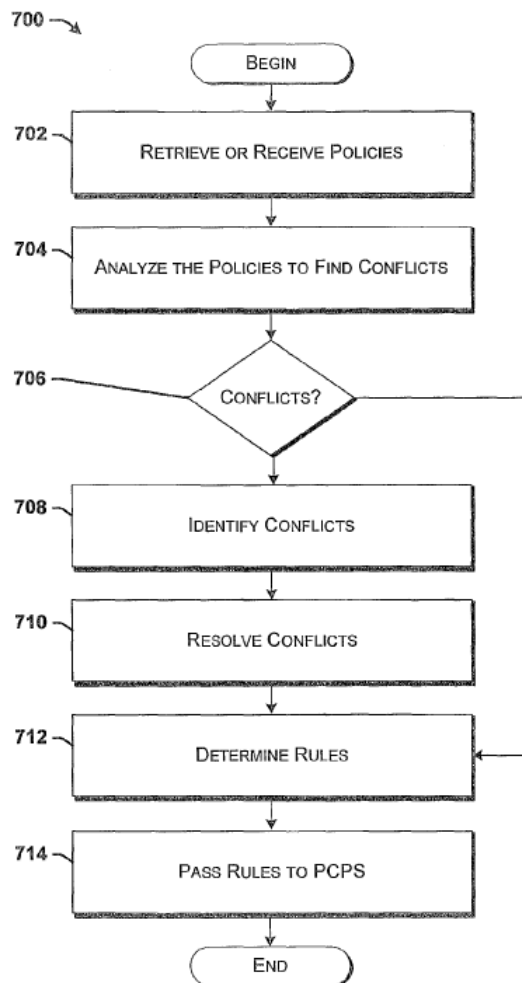


FIG. 7

70.EX-1004 FIG. 7, 19:4-20:36. The operation of Poh's PIRs and Figure 7 is detailed for element [1.3] below.

3. Rule Provisioning and Enforcement

71.Poh discloses that each network resource can have its own policy decision function and policy enforcement point. EX-1004 1:22-25. Policy decisions

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typically involve examining (e.g., filtering) some aspect of network traffic,
and an enforcement action is taken for the traffic in the event of a match.

EX-1004 1:25-35 (detailing charging policy enforcement and actions).

72. Poh's PCPS can identify rules for provisioning the PCRF, PCEF, OCS, and
ISGW network elements. EX-1004 14:10-13, 11:57-64, 24:1:8, FIG. 10.
Rules are passed from the PCPS to the network elements as instructions.
EX-1004 11:26-28; 16:32-35; 18:41-48, 21:8-34.

73. Poh's PCRF is a decision point function in the network layer for control,
altering of QoS, where applicable, and providing dynamic or personalized
charging rules at a subscriber level. The dynamic charging rules can be
operator-defined such as roaming control, usage threshold, subscriber
entitlements, subscriber prohibitions, and/or subscriber and subscription
profile data. The PCRF can also trigger messages and/or notifications to
subscribers for events such as differential charges, or if the PCRF is
triggered to treat the subscriber differently than the subscriber's expected
treatment. For example, the PCRF can note that an enhanced charge rate,
dropped IP flow, and/or QoS change will be invoked for a service or

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application. Upon such a determination, the PCRF (or PCEF) triggers a subscriber notification for the change. EX-1004 14:17-35.

74. Poh's PCEF is an enforcement point function that can reside in a gateway function 130. The PCEF enforces subscriber level control and charging policies for packet data protocol (PDP) contexts and IP flow, for example. The PCEF can be invoked by the rules or charging event trigger and can trigger the OCS to take actions including, for example, providing an "advice of charge," or tracking usage. EX-1004 14:36-46.

4. ISGW

75. Poh's ISGW implements security policies provisioned to it from the PCPs. EX-1004 11:57-64, 24:1:8, FIG. 10. Using the security policies, the ISGW monitors network traffic and recognizes security threats. EX-1004 23:8-11; 24:31-38. The ISGW sends information relating to security threats directly to a policy enforcement and/or access control enforcement point such as, for example, the PCRF. EX-1004 23:17-20. The ISGW can analyze the security threat to determine an enforcement point including the ISGW itself or the PCRF, the PCEF, or another network node. EX-1004 39-50.

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76.To the extent Poh does not provide the details of filtering performed by rules or the specific prioritization and enforcement mechanisms used by Poh, Maes describes these details

77.[This paragraph left intentionally blank].

B. Maes (EX-1005)

78.Maes teaches “A smart router is used to analyze messages and apply programmable policies to messages based on various diagnostics. Policies can be set by applications or other appropriate entities, such as a service layer. The smart router is able to delegate specific tasks, such as various transport (e.g., firewall, network bandwidth/congestion monitoring), service (e.g., charging, determine quality of service, identify session, filter service level content), and processing (e.g. codec transformation) tasks. Based on the result of the processing, the router can bounce, re-direct, route, or otherwise handle the network traffic.” EX-1005 Abstract.

79.Maes discloses a smart router that analyzes messages and/or packets (or other communications) in a telecommunications network (i.e., traffic), identifies information about the traffic, and applies programmable policies to the messages. EX-1005 Abstract, [0007], [0019], [0022]. Maes’ policies

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address processes as security, charging, logging, auditing, quality of service (including throttling, prioritized routing, etc.), privacy, preferences, and anything else specified by a combination of conditions and actions. EX-1005 [0023]. A “policy rule” is a “combination of a condition and actions to be performed if the condition is true.” EX-1005 [0024].

80. An operator defines business objectives implemented as policies enforced through rules. For example, policies can include “any combination of rules, including any combination of conditions and actions” and workflows or business processes can “describe sequences in which rules are executed, or how conditions may be combined with action to enforce the one or more policies on a communication.” EX-1005 [0025]. “A workflow or business process includes a logical combination of one or more conditions to be satisfied and one or more actions to be executed to enforce or evaluate the one or more policies.” EX-1005 [0025].

81. Maes’ policies include complex nested policy arrangements. For example, Maes incorporates by reference US 11/024,160, which issued as U.S.

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8,032,920 (“Maes II”) (EX-1011). EX1005 [0025].¹ Maes II discloses that “each policy ... may itself be composed of multiple policies, which further evaluate conditions and/or perform actions.” EX-1011 3:13-17. Maes II teaches that it was known to use any logical arrangement or sequence of conditions and actions. EX-1011 3:35-46, 4:37-47. Policies and actions can be executed serially (as discussed above) or in parallel and policies to be applied may depend on the results of previous actions. EX-1011, 1:48-50; 5:4-5; 6:8-11; 6:37-62.

82.Exemplary policies described by Maes include:

83.Conditions and actions to check the load of a network route or an end point and redirect a message accordingly where possible and advantageous (*i.e.*, load balancing).

84.Check the QoS for the traffic or traffic type and route accordingly.

¹ A patent that is specifically incorporated by reference is broad and unambiguous, and plainly sufficient to incorporate the referenced patent in its entirety.

Paice LLC v. Ford Motor Co., 881 F.3d 894, 907 (Fed. Cir. 2018).

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85. Throttle back traffic when maximum capacity is reached, or when other conditions are met, such as receiving more message traffic than is authorized.

86. Check account standing and charges, such as within the service layer to a charging enabler, or to a billing system capable of correlating them with the information about the service if available.

87. Determine that traffic may have to be filtered, or may require further processing in the service layer. For example, a policy can determine that traffic pertains to messaging such as MMS or email, and can send the traffic to a filtering application (e.g., content filtering, anti-spam, antivirus, privacy/preference policies of target, etc.).

EX-1005 [0026]-[0027].

88. FIG. 2 shows the smart router 202:

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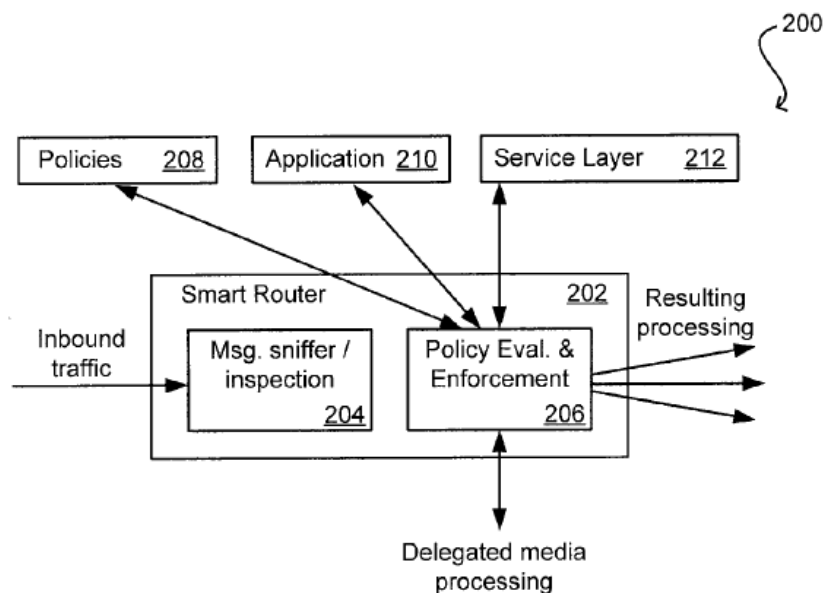


FIG. 2

89.EX-1005 FIG. 2. In this figure, inbound traffic is received by a sniffer or message inspection module 204 of the smart router 202. A policy evaluation and enforcement module 206 of the smart router receives messages from the message inspection module 204, and applies policies to the messages. EX-1005 [0028].

90.[This paragraph left intentionally blank].

C. Maes II (EX-1011)

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91. Maes II “Methods, systems, and machine-readable mediums are disclosed for policy enforcement. In one embodiment, the method comprises receiving a communication and executing a workflow to apply one or more policies to the communication. The workflow includes a logical combination of one or more conditions to be satisfied and one or more actions to be executed to enforce the one or more policies on the communication.” EX-1011, Abstract.

92. Maes II is incorporated by reference into Maes. Maes II is relied upon to explicitly confirm what a POSA would already understand: “each policy ... may itself be composed of multiple policies, which further evaluate conditions and/or perform actions.” EX-1011 3:13-17. Maes II teaches that it was known to use any logical arrangement or sequence of conditions and actions. EX-1011 3:35-46, 4:37-47. Policies and actions can be executed serially (as discussed above) or in parallel and policies to be applied may depend on the results of previous actions. EX-1011, 1:48-50; 5:4-5; 6:8-11; 6:37-62.

93.[This paragraph left intentionally blank].

D. Burnett (EX-1012)

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94. Burnett teaches “Systems, devices, and methods for providing a dynamic subscription update feature in a wireless communications network are disclosed herein. An exemplary system for providing a dynamic subscription update feature in a wireless communications network is configured to receive offline data and in-call data from a plurality of network entities for use in determining, in accordance with one or more rules, whether at least one subscriber is eligible to receive a subscription update offer and receive a response message indicating whether the at least one subscriber accepts or declines the offer. A device configured to receive a subscription update offer and respond with an acceptance or decline message is disclosed.” EX-1012, Abstract.

95. Burnett is directed to a system and method for allowing a wireless subscriber to dynamically update their service plan. Specifically, the system provides the subscriber with a notification via SMS and email that includes a service plan update offer. In response to the update offer, the subscriber indicates whether it accepted or declined the offer. The system updates the service plan for the subscriber as applicable. EX-1012 1:64-2:12; 2:23-27; 2:28-46.

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E. Background Prior Art

96. A number of additional other references demonstrate that all of the aspects of the claimed invention were well-known to a POSA long prior to the filing of the '543 patent.

97. The following section describes the state of the art for network service plan provisioning systems as of January 2009. The prior art references, and the discussions of what was known to a POSA, provide general description of the state of the art and additional motivation to modify or combine the reference(s). Accordingly, these references should be considered by the Board.

1. Network Service Plan Provisioning Systems

98. Using network based policies to configure network devices is known as Policy-Based Networking (PBN). Prior to PBN, configuring network devices, such as routers, switches and other network elements, involved an administrator configuring each device independently. Later, other technologies attempted to automate the process such as using the Simple Network Management Protocol (SNMP). EX-1006 pp. 247-248.

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99.PBN uses control/management policies, i.e., the rules that govern the network behavior. The administrator edits policies in a management tool that performs syntax, semantics and basic conflicts checking. These policies are then distributed to special policy servers called Policy Decision Points (PDPs). The PDPs process the policies, along with other data such as network state information, and take policy decisions about what policies should be enforced and how enforcement will happen. The policies are sent as configuration data to the appropriate Policy Enforcement Points (PEPs), which reside on management devices (e.g., routers, switches, gateways, etc.) and are responsible for installing the policies and enforcing them. EX-1006 p. 248; EX-1007 p. 14.; EX-1008 p. 2978; EX-1009 pp. 20-21; EX-1010 p. 16. Below is a diagram of a known PBN basic schema:

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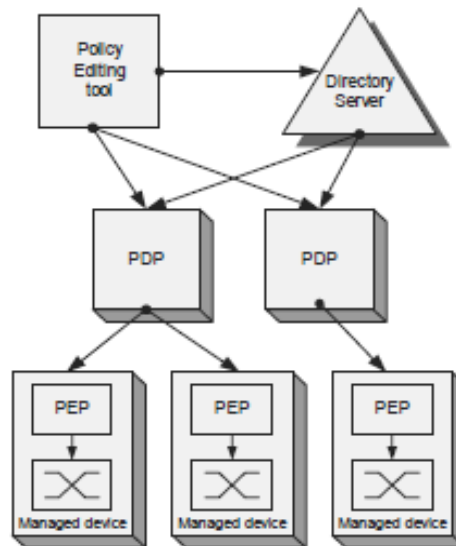


Figure 1. The Policy-Based Networking basic schema

100.

101. EX-1006 p. 248.

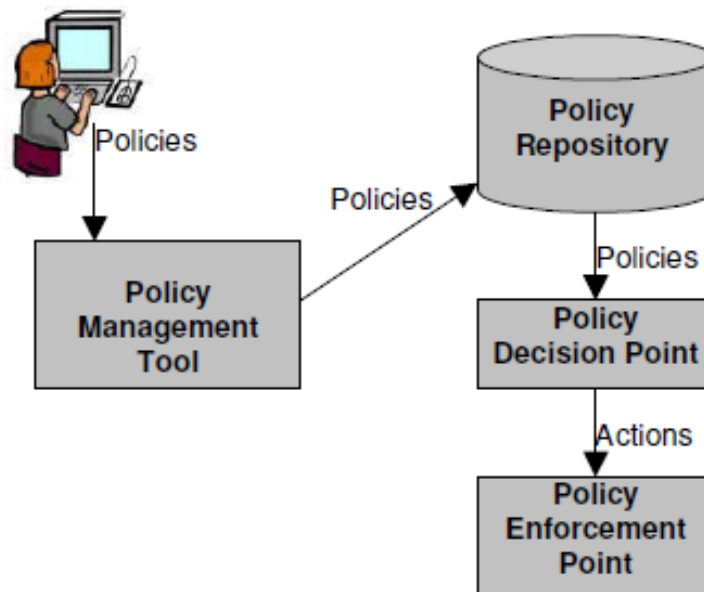


Figure 1. A general policy based systems management architecture

102.

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103. EX-1007 p. 14.

104. PBN contemplated two models of operation—outsourcing and provisioning. In the outsourcing model, when the PEP receives a network event that it does not know how to handle, it sends a request to the PDP and the PDP responds by sending the configuration data that must be installed to respond to the event. In the provisioning model, the PDP sends the policies that must be enforced when the PEP connects to the PDP. EX-1006 p. 248; EX-1009 p. 20-21.

105. PBN architectures such as shown above have been proposed by the Internet Engineering Task Force (IETF) and adopted in cellular systems, such as those governed by the 3GPP standards. EX-1008 p. 2977; EX-1010 § 5.1 (Reference Architecture). For example, in 3GPP Release 8 (and earlier releases), the Policy and Charging Rules Function (PCRF) provides the role of the PDP and the Policy Charging and Enforcement Function (PCEF) provides the role of the PEP:

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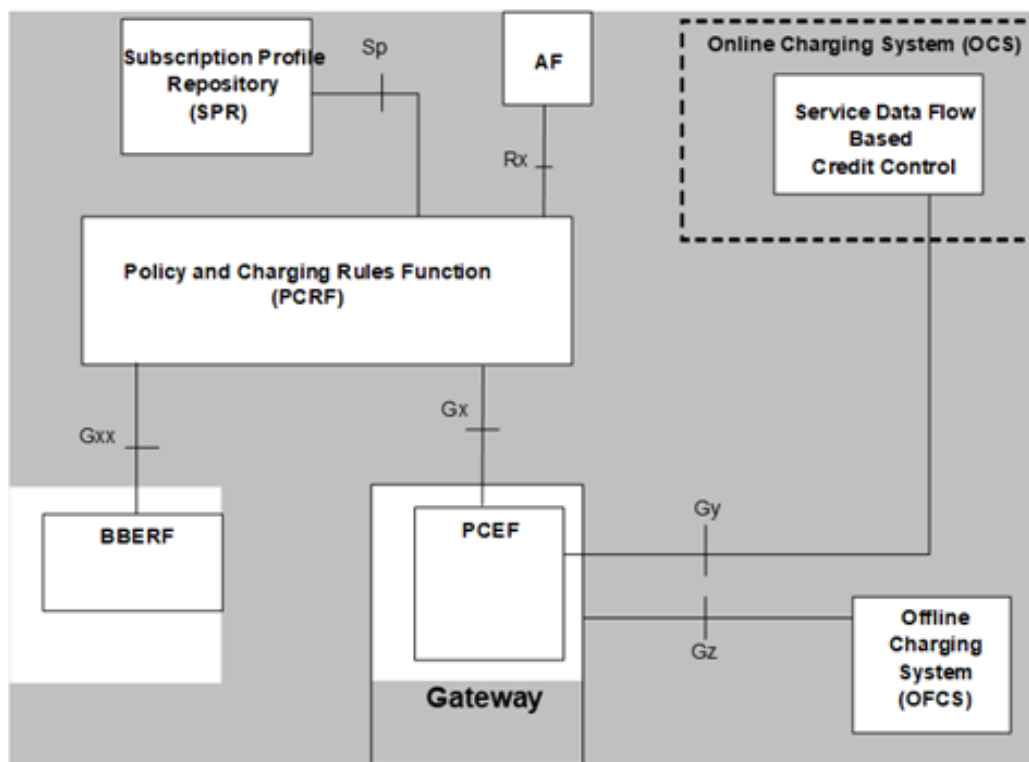


Figure 5.1.1: Overall PCC logical architecture (non-roaming)

106. EX-1010 p. 16. In the architecture above, rules could be predefined or dynamically provisioned at establishment and during the lifetime of a session, such as through the Gx reference point above. EX-1010 pp. 12, 19-20, 26, 45.

2. Policy Transformation and Translation

107. Generally, it was known that a policy management tool can take policies entered by an administrator and convert them to a form that can be deployed and interpreted by PEPs. EX-1007 p. 13; EX-1008 p. 2978 (“A

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policy management tool is often used to ensure the automatic translation of the policies from the high or business level to the low or network level policies.”); EX-1009 p. 21, 22. The transformation may be performed at the PEP. EX-1007 p. 13.

108. FIG. 2 below shows a policy-based management architecture incorporating policy transformation in the policy management tool. EX-1007 pp. 14-15:

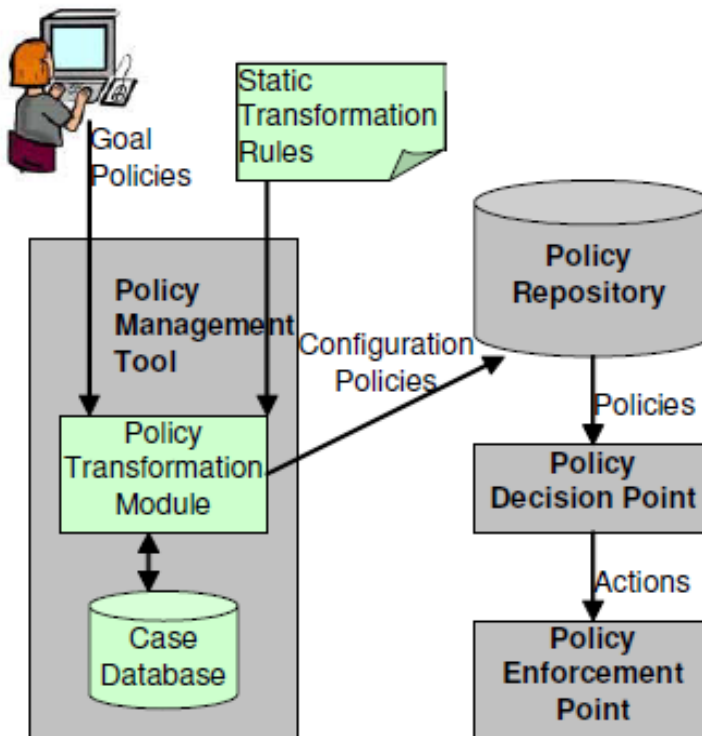


Figure 2. A policy based systems management architecture enabled with static policy transformation

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109. EX-1007 p. 13.

110. In real time policy transformation, the policy-based management system uses an online component that dynamically monitors the behavior of network elements in order to ensure that the specified policy objectives are being met. System behavior is used by the transformation module to dynamically modify the configuration of the system to achieve the policy goals. EX-1007 p. 15.

3. Rules and Rule Priority

111. It was known that policies that are enforced by PEPs included rules that typically include: (1) matching (i.e., filtering) criteria for identifying packets and data flows; and (2) actions. These rules are determined by the operator based on, for example, user subscription information. Matching criteria may include 5-tuple information (i.e., source IP address, destination IP address, source port number, destination port number, and protocol ID) of incoming packets. If an IP packet, for example, matches filtering criteria, then the PEP takes the decision or action that the policy specifies. Actions may include, for example, allow or deny packets, guarantee a certain quality of service (QoS) level, perform reporting, performing

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charging functions, etc. EX-1006 p. 253; EX-1010, §§ 4.1 (General Requirements), 4.2 (Charging Requirements), 4.3 (Policy Control Requirements), 6.2.2 (Policy and Charging Enforcement Function (PCEF)), 6.3 (Policy and Charging Control Rule), 6.5 (Quality of Service Control Rule).

112. It was also known to assign rules and policies a priority, and rules and policies were evaluated according to their priority. In some cases, in the event of conflicts between policies, the order of the policies determined the priority. EX-1006 p. 253; EX-1009 pp. 22-23; EX-1010 p. 48,

113. One form of policy validation performed as part of policy transformation was conflict resolution. For example, in a policy with multiple rules, individual rules may be perfectly acceptable by themselves, but there is a conflict when any two rules are taken together. If a conflict is found, one way the conflict can be resolved is to assign the rules different priorities. Since priority can be considered an independent term for conflict resolution (i.e., beyond other triggering criteria and actions specified in the rules), policies and rules with different priorities did not overlap and thus did not cause conflicts. EX-1009 pp. 22-23

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114. [This paragraph left intentionally blank].

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X. DETAILED UNPATENTABILITY ANALYSIS FOR THE ‘543

115. For the ‘543 patent, I have been asked to provide an opinion as to whether the Challenged Claims are obvious over the combinations of Poh, Maes (including incorporated by reference Maes II), and Burnett as set forth in the table of Grounds in Section IV above. Both combinations are considered in light of the knowledge of a POSA.

116. As part of my obviousness analysis, I have considered the scope and content of the prior art, described above and below. Additionally, I considered whether any differences between the alleged invention and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the alleged invention. I have also considered the level of ordinary skill in the pertinent art in performing my analyses.

117. For ease of reference, I have arranged the Grounds below to correspond with the Grounds as presented in the IPR petitions (noting that claim 1 is presented in a largely identical fashion in both petitions).

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A. Ground 1: Claims 1, 2-7, 11-13, 22-23, 30-33, 35-41, 90-93, and 112-113 Are Obvious Over Poh Combined with Maes.

118. As detailed below, Poh in combination with Maes as read in light of the knowledge of a POSA, teaches, including renders obvious, Challenged Claims 1, 2-7, 11-13, 22-23, 30-33, 35-41, 90-93, and 112-113 and thus renders these claims unpatentable.²

119. [This paragraph left intentionally blank].

1. A POSA Would Have Been Motivated To Combine Poh, With Maes With A Reasonable Expectation Of Success.

120. A POSA would be motivated to combine Poh with a reasonable expectation of success.

121. Both references pertain to the same general subject matter of specifying and enforcing policies related to the control and management of network traffic including charging.

122. Poh teaches a provisioning system for a wireless access network that (i) obtains and stores policies, (ii) processes those policies to create rules (in

² As used herein, “discloses” or “teaches” includes that the reference’s disclosure renders the discussed concept (element, claim) obvious to a POSA.

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the form of instructions), where processing those policies involves giving one policy precedence over another, and (iii) provisions those rules to network elements in the wireless access network for policy enforcement. While Poh may not expressly state that each policy has (i) a “traffic classification filter” for filtering traffic events by a traffic inspection system and (ii) an enforcement action that is triggered in a network policy enforcement system, or state that one traffic classification filter can be given “priority” over a second traffic classification filter, Maes discloses that each rule that effectuates a policy is a “combination of a condition and actions to be performed if the condition is true.”

123. Maes also discloses that policies are applied to traffic that has been inspected by a sniffer/inspection module if they match traffic criteria for application of the policy. Maes also confirms that rules can be arranged in any sequence, with any combination of conditions and actions, to effectuate the business objectives of the policy or policies, i.e., “policies can address such processes as security, charging, logging, auditing, quality of service (including throttling, prioritized routing, etc.), privacy, preferences, and

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anything else specified by a combination of conditions and actions.” EX-1005 [0023].

124. Thus, a POSA understood that policy rules with criteria for filtering (matching) traffic (e.g., to identify traffic for quality of service, throttling, prioritized routing, etc.) and actions to be taken upon a match, and prioritization of such rules by their traffic classification filters, were well known in the art as evidenced by Maes. A POSA would have understood the types of rules disclosed in Maes, and their prioritization, could be used by the provisioning system of Poh for provisioning Poh’s network elements, such as Poh’s PCRF, PCEF and/or ISGW network elements, to achieve Poh’s policy objectives.

125. A POSA would be motivated to modify the teachings of Poh to use the rules of Maes, where each rule or group of rules includes a traffic classification filter and an action or actions to be taken. For example, the types of policies—and thus the types of rules that embody those policies—used in both Poh and Maes overlap, including policies for security, charging, logging, auditing, QoS (including throttling, prioritized routing, etc.), and privacy, for example. *See* EX-1004 11:57-67, 14:17-24; EX-1005

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[0023]. Further, Poh and Maes both disclose the use of those policies in wireless access networks, where rules embodying those policies are enforced against network traffic by enforcement points.

126. A POSA would have also been motivated to order the rules of Poh, as suggested by Maes, in an order that gives priority to a first rule’s traffic classification filter over a second rule’s traffic classification filter. Indeed, Poh already discloses that as part of resolving conflicts of one policy over another, one policy can be given “precedence” over another. A POSA understood that “precedence” is a form of “priority”. A POSA would have understood, as confirmed by Maes, that one technique for giving a policy precedence over another is to give that policy priority over the other by ordering its rules such that they are executed—and thus its filtering criteria is evaluated—before the other.

127. A POSA would be confident of the success of the modification as it is a software solution that uses known techniques—rules and logical arrangement of rules—for their intended purpose—implementing objectives of policies in a network.

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128. Poh and Maes are also analogous art to the claimed invention, being in the same field of network communications, including network service plan provisioning systems for network policies. EX-1001 claim 1; EX-1004 1:8-24; EX-1005 [0007], [0024].

129. Further, the combination of Poh and Maes is directed to the same problem as the '543 Patent—properly provisioning network elements to implement network and operator policies and objectives—and proposes the same solution—provisioning network elements with the appropriate logical arrangement of rules for enforcing network and operator policies and objectives. Thus, the Challenged Claims are unpatentable over this combination.

130. In addition to these various motivations as discussed in this section, I have identified further motivations that are particularly relevant to various claim elements in the detailed analysis below.

131. [This paragraph left intentionally blank].

2. These Challenged Claims Are Obvious Over Poh Combined with Maes.

132. Poh teaches each element of claim 1 in combination with Maes and in view of the prior art.

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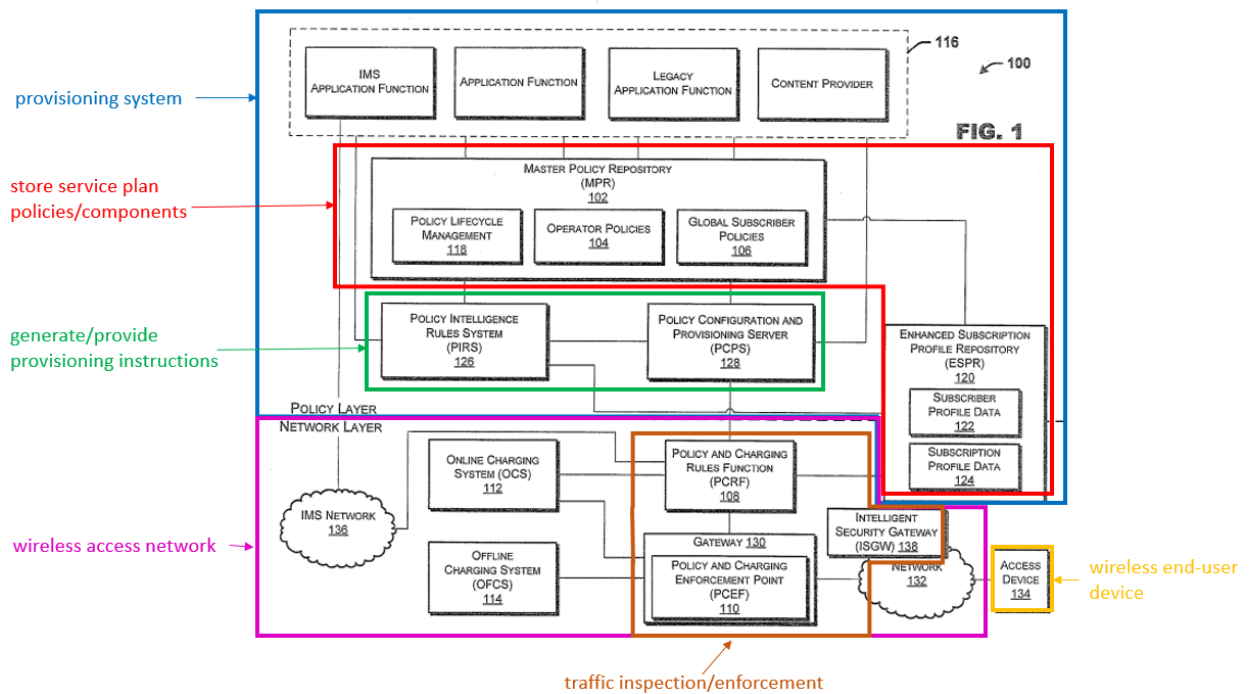
133. [This paragraph left intentionally blank].

a) **Claim 1**

i. [1.0] A network service plan provisioning system communicatively coupled to a wireless end-user device over a wireless access network, the network service plan provisioning system comprising one or more network elements configured to:

134. If the preamble is limiting, Poh's FIG. 1 illustrates a network service plan provisioning system (blue) communicatively coupled to a wireless end-user device (gold) over a wireless access network (pink), the network service plan provisioning system comprising one or more network elements (blue, red, green, brown).

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135. EX-1004 FIG. 1, annotated (“Annotated FIG. 1); 11:10-15:24
(describing Figure 1). The details of each of these elements are discussed
in the analysis below.

136. [This paragraph is left intentionally blank].

**ii. [1.1] obtain and store a first service plan
component and a second service plan
component,**

137. Poh discloses this element.

138. Poh’s Master Policy Repository (MPR) 102 (red) stores and/or
retrieves all policies (*obtain and store a first / second service plan*

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components). EX-1001 19:25-27 (“the MPR 102 stores and/or retrieves all policies, and the PIRS 126 receives the policies from the MPR 102...”). Thus, Poh discloses a network element configured to obtain and store the first and second network plan components as those components are used and further refined and identified in the subsequent claim elements below.

139. Specifically, Poh’s policy realization framework is divided into a policy layer (blue) and a network layer (pink). Poh’s policy layer handles policy management, rule generation for implementing policies and provisioning of the network layer with generated rules.

140. Poh’s policy layer includes application and service policy management systems and network policy management systems. The policy layer stores, organizes, determines, and applies policy rules to services requested by subscribers or other entities. The policy layer provides common policy rules across services and applications, and policy rule management. The policy layer dynamically determines rules based upon operator policies, network policies, subscriber specific policies, subscription specific policies, subscriber profile data, subscription profile data, and/or subscriber preferences. The policy layer can also generate

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instructions or commands for driving elements in the network layer to grant, restrict, and/or deny requested services. Rules can be determined online, i.e., during a service or application session, and in real-time or near real-time. Additionally or alternatively, the policy rules can be determined offline, i.e., not during a service or application session. EX-1004 11:9-33

141. Further, Poh's MPR (red) is part of the policy layer and receives, retrieves, accesses, organizes, and/or manages operator policies and global subscriber policies. EX-1004 1:53-55 Further, Poh's MPR can be fed by other policy repositories, such as an enhanced subscription profile repository (ESPR) that can be configured to store subscriber and subscription profile data and subscription profile data. In an embodiment, at least a portion of the data stored in the ESPR can be stored locally in, or migrated to, the MPR. EX-1004 12:55-13:2. Thus, the MPR citations include the functionality and operations of the ESPR.

142. As detailed below in limitation [1.2], policies for the operator / network / subscriber / subscription, subscriber / subscription profile data and/or subscriber preferences stored in the MPR include *a first service plan component and a second service plan component*.

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143. Thus, Poh discloses this element.

144. [This paragraph left intentionally blank].

iii. [1.2] the first service plan component comprising (1) information specifying a first traffic classification filter for filtering a traffic event in a network traffic inspection system, the traffic event being associated with the wireless end-user device and (2) a first network policy enforcement action that is triggered in a network policy enforcement system when the traffic event possesses a characteristic that matches the first traffic classification filter, and the second service plan component comprising (a) information specifying a second traffic classification filter for filtering the traffic event in the network traffic inspection system, and (b) a second network policy enforcement action that is triggered in the network policy enforcement system when the traffic event possesses a characteristic that matches the second traffic classification filter;

145. The proposed combination teaches these elements, particularly in light of the knowledge of a POSA. This element basically recites having two rules with each rule having a specific condition (filter) and action that occurs when that rule's condition is met.

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146. Poh discloses this limitation in the PCRF and PCEF actions that receive instructions to implement rules and enforce them, based on policies stored in the MPR related to the traffic associated with a wireless end user device.

147. As an initial matter, the '543 Patent does not describe what a “characteristic” is. That term is used in other contexts in the '543 Patent. E.g., EX-1001 14:20. However, given the context of the usage in the claim as something that “matches” a filter, a POSA understood that the “characteristics” refers to at least it is a condition or state (such as data) that triggers a rule, e.g., QoS, roaming, etc. For example, the '543 patent discusses “matches” in the context of “a traffic instance that matches the filter” (EX-1001 19:46-61); “a filter matches a traffic event rule ... such that a network state is detected” (EX-1001 21:19-23); “policy event rule matches a traffic event” (EX-1001 20:25-27); “network data amount does not match QoS policy limit” (EX-1001 32:14-20).

148. Poh provides several examples of this element. For example, Poh's PCRF is a decision point function in the network layer for control and is able to alter the QoS of a communication from a subscriber based on rules

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specifying subscriber entitlements, subscriber prohibitions, and/or subscriber and subscription profile data 122, 124.

The PCRF 108 is a decision point function in the network layer for control, altering of Quality of Service (QoS), where applicable, and providing dynamic or personalized charging rules at a subscriber level. The dynamic charging rules can be based on operator-defined dimensions such as, for example, roaming control, usage threshold, and based upon the subscriber entitlements, subscriber prohibitions, and/or subscriber and subscription profile data 122, 124.

149. EX-1004 14:17-24. The claimed “characteristics” encompass these “dimensions” and subscriber information. *See also* EX-1004 18:26-43 (policy trigger event includes a subscriber request for a network resource such as a service, application, QoS or the link).

150. This is an example of a first component comprising (1) identifying a required level of QoS for a specific client requesting wireless access, the traffic event being associated with the wireless end-user device (*information specifying a first traffic classification filter ...*) and (2) altering QoS to the required level for the subscriber (*a first network policy enforcement action ... triggered ... when the traffic event possesses a characteristic that matches the first traffic classification filter*).

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151. Similarly, this passage shows a first component that specifies a particular characteristic (such as a usage threshold or subscriber entitlement for a particular service) and a resulting action when a filter specifying that characteristic is matched (such as the actions of differential charging or denying/allowing/restricting the particular service based on the subscriber plan or entitlements and/or the action of notifying the subscriber). “The PCRF 108 can also trigger messages and/or notifications to subscribers for events such as, for example, differential charges, or if the PCRF 108 is triggered to treat the subscriber differently than the subscriber's expected treatment. For example, the PCRF 108 can note that an enhanced charge rate, dropped IP flow, and/or QoS change will be invoked for a service or application.” EX-1004 14:25-35. See also EX-1004 21:50-22:3 (identifying rules / conditions for actions such as differential charging or disabling applications); 8:57-63 (actions such as differential charging and notification); 11:44-52 (actions such as differential charging, gating control, notifications); claim 7 (listing different policies resulting in different actions); claim 3 (deny or allow access rule);

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152. In the context of Poh, “gating control” would include actions such as denying, allowing or restrict a particular service. EX-1004 11:23-30; 3:33-42, 19:60-63; 20:37-54.
153. Each of these rules / actions above can correspond to each of the first and second service plan components.
154. Further, Poh’s PCEF is an enforcement point function that can reside in gateway. The PCEF enforces subscriber level control and charging policies by the rules passed to the PCEF by the PCRF. The subscriber policies can include policies that are global to all subscribers and applied to one or more applications or services that are accessible to the operator’s subscriber base. Global subscriber policies can be defined for each service or application. A global subscriber policy includes a service aware roaming control policy to prevent a subscriber from accessing operator-defined services or applications while roaming. EX-1004 12:23-39. This is an example of a second component comprising (1) identifying whether or not the wireless subscriber requesting wireless access is roaming (*information specifying a second traffic classification filter ...*) and (2) preventing the wireless subscriber from accessing operator-defined services or applications

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while roaming (*a second network policy enforcement action ... triggered ... when the traffic event possesses a characteristic that matches the second traffic classification filter*).

155. Additionally, Poh teaches different operator policy types used for inspection and enforcement of traffic including gating control policies, data throttling policies, and packet inspection policies. EX-1004 11:57-60. Thus, Poh includes different combinations of policies that include first and second components for inspecting traffic and triggering an enforcement action.

156. Even though Poh does not expressly use the term “traffic classification filters,” a POSA understood that Poh discloses traffic classification filters. As detailed above, Poh’s rules rely upon classification of the particular traffic. For example, the roaming rules require a classification that the particular traffic (either requested or analyzed for usage threshold) is being classified as roaming. Each of the categories above involves some classification of the traffic including the volume of traffic (for usage), the type of traffic (for service/application based rules) or

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the quality of traffic (for the QoS rules). The ‘543 patent uses similar classification categories. EX-1001 35:52-36:46.

157. As discussed in the State of the Art section above, a POSA understood that it was known that policies are enforced by policy enforcement points, and these policy enforcement points receive rules that include matching (*i.e.*, filtering) criteria for identifying packets and data flows and enforcement actions to be applied upon matches. EX-1006 p. 253; EX-1010, §§ 4.1-4.3, 6.2.2, 6.3, 6.5; EX-1007 p. 13; EX-1008 p. 2978. A POSA understood Poh’s rules include a traffic classification filter because those rules includes (1) matching criteria, *e.g.*, the required QoS for traffic associated with a specific client, or whether the subscriber device is roaming, and (2) an enforcement action *e.g.*, alter the QoS, or prevent access to specific applications while roaming.

158. If Patent Owner asserts that Poh does not expressly state that its rules include *traffic classification filters*, a POSA would be motivated to modify the teachings of Poh to include traffic classification filters as taught by Maes for the reasons discussed in the Motivation to Modify Teachings section (§VI.A.3), above. Maes describes that a policy rule is a

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“combination of a condition and actions to be performed if the condition is true.” EX-1005 [0024]. Maes further describes that policies are applied to traffic that has been inspected by a sniffer/inspection module if they match traffic criteria for application of the policy traffic classification filters. Thus, as described in the Motivation to Modify Teachings section, a POSA would be motivated to modify the teaching of Poh so that each policy or policy rule has (i) a “traffic classification filter” for filtering traffic events by a traffic inspection system and (ii) an enforcement action that is triggered in a network policy enforcement system.

159. Thus, the proposed combination teaches these elements.

160. [This paragraph left intentionally blank].

iv. [1.3] process the first service plan component and the second service plan component to create a network provisioning instruction set in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter, the network provisioning instruction set comprising one or more traffic inspection provisioning instructions for the network traffic inspection system and one or more policy enforcement provisioning instructions for the network policy enforcement system, the network traffic inspection system

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***and the network policy enforcement system
implementing one or more policies applicable to
the wireless end-user device;***

161. Poh discloses this element. Effectively, this element recites two actions: (1) prioritizing the first filter over the second filter and (2) converting the rules to “instructions” for the network to implement.

162. Poh’s Policy Intelligence Rules System (PIRS) 126 (green) receives the policies and determines rules for the network to use in addressing subscriber requests (*process the first service plan component and the second service plan component to create a network provisioning instruction set*). EX-1004 18:59-61. Poh’s PIRS analyzes the policies to determine how the network should handle the request for resources. Rules determination includes reconciliation of the policies, to determine which policies should be given precedence, and/or additional operations to determine how the network, application or service should be instructed to implement and/or enforce the determined policy (*create a network provisioning instruction set ... with a prioritization of the first traffic classification filter over the second traffic classification filter*). EX-1004 20:26-35.

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163. The rules from Poh's PIRS are sent to Poh's PCPS to generate instructions for the PCRF, PCEF and/or ISGW to implement policy rule charging decisions, charging, and enforcement for the wireless subscriber (*the network provisioning instruction set comprising... traffic inspection provisioning instructions... and ... policy enforcement provisioning instructions ... implementing one or more policies applicable to the wireless end-user device*). EX-1004 16:28-34 (PCPS "receive[s] rules from the PIRS 126 and send[s] instructions to the PCRF, PCEF, and OCS ... for policy rule charging decisions, charging, and enforcement purposes. The PCPS 128 can receive rules from the PIRS 126, generate instructions for the PCRF, other elements in the network layer, and/or application servers, and send the instructions to the appropriate policy element"), EX-1004 21:8-34, Figs. 3, 8.

164. FIG. 7 schematically illustrates PIRS operation.

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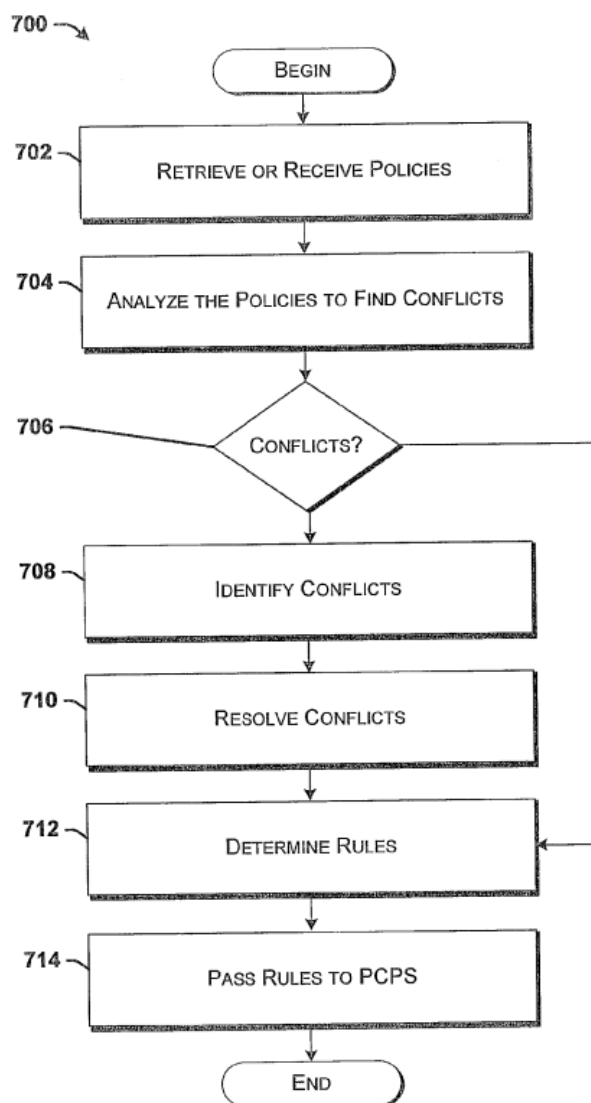


FIG. 7

165. EX-1004 Fig. 7.

166. In step 702, the PIRS retrieves and/or receives operator policies,
global subscriber policies, subscriber profile data and/or subscription profile

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data from the MPR. Events, such as the request of a network resource by a subscriber, can trigger sending of policies to the PIRS. EX-1004 19:19-29.

167. At steps 704-708, the PIRS analyzes policies to identify conflicts. For example, operator policies, global subscriber policies and/or subscriber policies may conflict with each other. Policy conflict identification includes identifying and tagging the conflicting policies and determining to perform more operations on the policies. EX-1004 19:30-48.

168. At step 710, PIRS resolves conflicts based on criteria such as policy conflict resolution rules and/or a policy resolution application. For example, if a network operator may specific policies to deny services based on privacy, safety, and/or liability concerns. PIRS can be configured to address any requests for services addressed by the operator policy by giving the operator policy precedence in policy conflict resolution, thereby determining to deny the service, even if a subscriber/subscription policy, allows such services. EX-1004 19:49-64.

169. Similarly, PIRS can be configured to give subscriber policies precedence over operator policies and/or global subscriber policies. EX-1004 19:65-20:25. By way of example, a subscriber can decide to disable

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SMS for an account. One or more subscriber policies can be generated to reflect the subscriber's choice. The network operator can determine that it wants to grant SMS resources by default to subscribers who request SMS resources. To implement this policy, the operator creates operator policies and/or global subscriber policies that grant SMS resources by default. PIRS can resolve conflicts by giving the subscriber's policies precedence over the operator policies and/or the global subscriber policies. For example, though an SMS resource may be granted by default to all subscribers, this particular subscriber can be denied the SMS resource to enforce the subscriber's policies 122, 124. Other conflict scenarios and resolution methods are possible and contemplated. EX-1004 19:65-20:25.

170. Thus, as detailed above, PIRS can be configured to resolve conflicts with operator policies by giving the operator policies precedence (... *a prioritization of the first traffic classification filter over the second traffic classification filter*). EX-1004 19:54-56.

171. At step 712, PIRS determines rules based upon policies. PIRS analyzes policies to determine how the network should handle the resource request. Determination includes policy reconciliation, precedence, and/or

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additional operations to instruct implementation and/or enforcement of the determined policy. EX-1004 20:26-36.

172. Furthermore, PIRS can determine a rule that reflects action needed to grant, restrict, and/or deny the requested resource. The determined rules reflect action determined by reconciling various policies or one or more policies that had no conflicts. For example, if analysis of an operator policy reflected a network operator's desire to grant a network resource, and analysis of subscriber policies also resulted in granting of a network resource, PIRS generates a rule that reflects the desired action, i.e., to grant the requested network resource to the subscriber. The generated rules can describe the determined network action in response to the resource request. At step 714, the rule is passed to other network elements. EX-1004 20:37-53.

173. Poh's PCPS receives rules, generates instructions implementing those rules and provides those instructions to policy elements such as the PCRF and PCEF for implementation. EX-1004 14:4-16; 16:28-34, 18:41-44, 20:61-61:34; Fig. 8.

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174. If PO asserts that Poh's determining of rules giving precedence to traffic classification filter over another is not the claimed *prioritization*, a POSA would be motivated to modify the teachings of Poh to include prioritization of Poh's rules by their traffic classification filters as taught by Maes for the reasons described in the Motivation to Modify Teaching section.

175. [This paragraph left intentionally blank].

v. [1.4] provide the one or more traffic inspection provisioning instructions to the network traffic inspection system; and

176. Poh, in view of Maes, teaches this element.

177. As detailed in [1.3] Poh's PCPS (brown) is configured to receive rules created by the PIRS and provide the instructions to elements such as the PCRF, PCEF and/or ISGW, any one of which is or includes a network traffic inspection system (provide ... traffic inspection provisioning instructions to the network traffic inspection system). EX-1004 14:4 10; 16:28-31.

178. [This paragraph left intentionally blank].

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vi. [1.5] provide the one or more policy enforcement provisioning instructions to the network policy enforcement system.

179. Poh, in view of Maes, teaches this element.

180. As detailed in [1.3-1.4], Poh's PCRF, PCEF, and/or ISGW is or includes a network traffic inspection systems and is or includes a network policy enforcement system and receives provisioning instructions from the PIRS. Further, Poh contemplates multiple PCRFs, PCEFs and ISGWs. EX-1004 14:4-10; 16:28-34.

181. In some embodiments, one of the PCRF, PCEF and ISGW operates as the network traffic inspection system and another of the PCRF, PCEF and ISGW operates as the network policy enforcement system. For example, the ISGW implements security policies provisioned to it from the PCPS to monitor network traffic and recognize security threats. EX-1004 11:57-64, 23:7-24:11, 24:31-38, FIG. 10. The ISGW sends information relating to security threats to a policy enforcement and/or access control enforcement point such as the PCRF. EX-1004 23:17-20. More specifically, the ISGW analyzes security threats to determine an enforcement point for a security policy that addresses the recognized threat. The enforcement point can be

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the ISGW itself or an access control enforcement point such as the PCRF,
the PCEF, or another network node. EX-1004 24:39-50.

182. [This paragraph left intentionally blank].

- b) **Claim 2 The network service plan provisioning system of claim 1, wherein process the first service plan component and the second service plan component to create a network provisioning instruction set in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter comprises order traffic inspection comparison operations in the one or more traffic inspection provisioning instructions such that the one or more traffic inspection provisioning instructions direct the network traffic inspection system to determine whether the traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter.**

183. The proposed combination teaches this claim.

184. This limitation is disclosed by Poh, alone, or in combination with Maes. For the same reasons discussed with Claim 1, Poh discloses a first traffic classification and a second traffic classification filter, and giving precedence to one policy over another. A POSA understood that Poh's disclosure of giving precedence of one policy over another means that rules (*traffic classification filter*) would be applied in order of precedence (... *traffic inspection provisioning instructions ... to determine whether the*

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traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter).

185. Poh provides several examples that multiple conditions can be required and that a POSA would recognize would be implemented by applying one policy sequenced before applying a second policy. For example, the first classification filter would be a form of authorization (“an allow access rule that allows access to the requested [IP] service”) and then the second classification filter would be application-specific QoS (e.g., a “QoS change will be invoked for a service or application”). EX-1004 5:23-34, 14:29-30. Another example would be the first traffic classification filter to determine whether the user is roaming, and if so, the second classification filter can determine which services to allow while roaming, e.g., allowed to (or not) access Internet when roaming. EX-1004 12:29-31 (“service aware roaming control policy that can prevent a subscriber from accessing operator-defined services or applications while roaming”); 13:50-53; 21:53-61 (various “combinations” of different policies including roaming).

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186. Alternatively, in the same example, if the user is allowed to roam, the second classification filter can determine the charging model for type of communications when roaming. EX-1004 14:21-23 (“dynamic charging rules ... based on ... roaming control”). Basically, any specific rule types can be sequenced in the claimed fashion including usage rules such as thresholds, QoS, roaming, application types, and rules at different levels (e.g., operator, global subscriber, or individual subscriber as detailed above). As a further example, rules that have higher priority / precedence would be sequenced first. For example, if a higher precedence operator rule precluded a particular action (e.g., a particular service or application), then a POSA would understand that such a rule would be evaluated first, followed by a subscriber rule because the evaluation of the operator rule may eliminate the need to evaluate the subscriber rule.

187. Moreover, by their very nature, it is obvious to apply rules in sequence. A POSA would recognize that two rules below that are written differently are still logically the same:

1. “If [condition A] and [condition B] then [action]”
2. “If [condition A] then

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If [condition B] then

[action]”

188. The specific format of the rule specification is an implementation detail that is obvious.

189. To the extent that Patent Owner argues that Poh does not expressly state determining *whether the traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter*, Maes discloses this limitation. Specifically, Maes discloses that rules can be arranged in any sequence, with any combination of conditions and actions, to effectuate the business objectives of the policy or policies, i.e., “policies can address such processes as security, charging, logging, auditing, quality of service (including throttling, prioritized routing, etc.), privacy, preferences, and anything else specified by a combination of conditions and actions.” EX-1005 [0023].

190. Thus, a POSA understood that the teaching of Poh would be modified so that the *first traffic classification filter* would be executed in sequence before the *second traffic classification filter*, as taught by Maes. A POSA

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would be motivated to modify the teachings of Poh with the teachings of
Maes for the reason described in the Motivation to Modify Teachings
section above.

191. [This paragraph left intentionally blank].

- c) **Claim 3 The wireless end-user device of claim 2, wherein the one or more processors are further configured to override the selective denial of one or more Internet service activities by or on behalf of the particular application when the user has augmented the differential traffic control policy so as to indicate that Internet service activities are allowable when the classified wireless network is the WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.**

192. The proposed combination teaches this claim.

193. This limitation is disclosed by Poh, alone, or in combination with
Maes. As detailed for Claim 2, Maes discloses that rules can be arranged
in any sequence, with any combination of conditions and actions, to
effectuate the business objectives of the policy or policies. Thus, as
modified by Maes, Poh discloses that you only get to the second traffic
classification filter if the first traffic classification does not trigger.

194. An example of this would be when the first traffic classification filter
triggers when the user is roaming, and the second classification filter

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identifies the applications available to the user when the user is not roaming
*(determine whether the traffic event possesses the characteristic that
matches the second traffic classification filter only if the traffic event does
not possess the characteristic that matches the first traffic classification
filter)*. Similarly, for a pair of rules that prevent roaming for certain
applications and then differentially charge for roaming, the charging rule
would only need to be evaluated if the first rule does not match the filter
(e.g., the list of applications for which roaming is not allowed).

195. Even if Poh does not disclose this sequence of evaluations, a POSA
would be motivated to modify the teachings of Poh with the teachings of
Maes for the reason described in the Motivation to Modify Teachings
section.

196. [This paragraph left intentionally blank].

- d) **Claim 4 The network service plan provisioning system of
claim 2, wherein process the first service plan component
and the second service plan component to create a network
provisioning instruction set in accordance with a
prioritization of the first traffic classification filter over the
second traffic classification filter further comprises include
in the network provisioning instruction set one or more
instructions directing the network traffic inspection system
to determine whether the traffic event also possesses the
characteristic that matches the second traffic classification**

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**filter if the traffic event possesses the characteristic that
matches the first traffic classification filter.**

197. This limitation is disclosed by Poh, alone, or in combination with Maes, for the reasons discussed with respect to Claims 1-3. Further, Maes discloses that a policy refers to an ordered combination of policy rules that defines how to administer, manage, and control access to resources. A policy contains a combination of conditions and actions, with a condition being any expression that yields a Boolean value and an action (e.g., invocation of a function, Script, code, workflow) being associated with a policy condition in a policy rule. An action is executed when its associated policy condition results in “true” from the policy evaluation step. EX-1004 [0024]. Thus, a POSA understood that Boolean logic would be used such that the second traffic classification filter would be considered if the first traffic classification filter is true.

198. Poh provides several examples where multiple conditions are required and that triggering of one policy results in triggering of a second policy. For example, the first classification filter could be a form of authorization (subscriber is allowed IP communications/internet access) and then the second classification filter could be application-specific QoS. Another

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example would be the first traffic classification filter determines whether the user is roaming, and if so, the second classification filter determines which services to allow while roaming, e.g., allowed to (or not) access Internet when roaming. Or in the same example, if the user is allowed to roam, the second classification filter can determine the charging model for type of communications when roaming. There are any number of scenarios expressly taught by the combination of Poh and Maes, and a POSA would be motivated to modify the teachings of Poh with the teachings of Maes for the reason described in the Motivation to Modify Teachings section.

- e) **Claim 5 [5.0] The network service plan provisioning system of claim 1, further comprising:**
- vii. [5.1] a policy enforcement priority rule datastore including a policy enforcement priority rule for determining whether the traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter,***
 - viii. [5.2] and wherein process the first service plan component and the second service plan component to create a network provisioning instruction set in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter***

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***comprises include the policy enforcement
priority rule in the network provisioning
instruction set.***

199. Poh discloses this limitation for the same reasons discussed with Claims 1-4. This claim essentially calls for a “priority rule” to determine the order of evaluation of the first/second filters.
200. As detailed in element [1.1] and Section VI.A.1(a), Poh’s MPR categorizes and stores received policies. EX-1004 18:9-25. As detailed in element [1.3], Poh’s PIRS analyzes the stored policies to resolve conflicts and prioritize those policies. EX-1004 Fig. 7, 19:4-20:6.
201. Poh’s PIRS includes policy reconciliation instructions 206 and rules determination instructions 208 that may resolve conflicts with operator policies by giving the operator policies precedence as detailed in [1.3] (policy enforcement priority rule [and] datastore). EX-1004 15:33-16:3, 19:50-64, 20:26-36, Figs. 2, 7.
202. A POSA understood that the PIRS functionality to process the rules (e.g., to resolve conflicts) teaches ordering the evaluation of rules/policies—thus establishing a priority. For example, Poh discloses that the PIRS can be configured to give subscriber policies precedence over

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operator policies and/or global subscriber policies (determining whether the traffic event possesses the characteristic that matches the first traffic classification filter before determining whether the traffic event possesses the characteristic that matches the second traffic classification filter). For example, operator policy and/or a global subscriber policy may grant access to a particular resource, while a subscriber policy denies the subscriber access to the same resource that the operator policy and/or the global subscriber policy allow. EX-1004 19:65-20:5. In this case, giving priority to a subscriber policy over an operator/global policy is an example of a policy enforcement priority rule based on policy reconciliation instructions 206 and rules determination instructions 208 (a policy enforcement priority rule datastore). Similarly, a rule allowing (or denying) roaming access would sensibly be evaluated before a rule specifying differential charges for roaming. Poh teaches (1) any of its policy criteria can be specified at operator, global, or subscriber levels; and (2) the precedence rules can specify precedence for any of the levels over the other. Thus, effectively, Poh teaches that any of the rules can have precedence based on the policy reconciliation instructions 206 and rules determination instructions 208.

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203. As noted in element [1.3], Poh's PIRS sends the processed policies to the PCPS which further processes the policies and generates instructions.

EX-1004 14:4-16, 16:3-37, 21:8-34, Figs. 3, 8.

204. Thus, in operation, the PIRS and PCPS processing includes the policy enforcement priority rule in the network provisioning instruction set because the instructions ultimately generated include the results of ordering the filter evaluation as per the policy reconciliation instructions and rules determination instructions (in accordance with a prioritization of the first traffic classification filter over the second traffic classification filter comprises include the policy enforcement priority rule in the network provisioning instruction set).

205. If PO asserts that the policy enforcement priority rule must be expressly included in the network provisioning instructions set as a separate instruction/rule, a POSA understood that including an express rule in the provisioning instructions to give one policy priority over another is an obvious variant of achieving that through ordering of rules. Thus, such an express rule is merely an implementation detail for which there are only two options: express rule or an implicit rule defined in the ordering of

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policies. Selecting one from the limited number of different known implementations is a design choice that does not impart patentability.

- f) **Claim 6 The network service plan provisioning system of claim 5, wherein the policy enforcement priority rule comprises a priority order for a plurality of traffic classification filters, the plurality of traffic classification filters including the first traffic classification filter and the second traffic classification filter.**

206. Poh discloses this example for the same reasons discussed with respect to Claim 5.

- g) **Claim 7 The network service plan provisioning system of claim 5, wherein the policy enforcement priority rule comprises a priority specification for one or both of the first service plan component and the second service plan component.**

207. Poh discloses this example for the same reasons discussed with respect to Claim 5.

- h) **Claim 11 The network service plan provisioning system of claim 5, wherein the one or more network elements are further configured to provide a user interface for a service plan design environment that provides for entering the policy enforcement priority rule in the design environment by entering a priority assignment for the first service plan component, entering a priority assignment for the second service plan component, positioning the first and second service plan components in a priority ordering, defining the first or second service plan component as belonging to a**

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service type that has an implied or literal ordering, or a combination of these.

208. Poh discloses this claim.

209. As an initial matter, as detailed in Section IV.F (State of the Art), a POSA already knew before the Priority Date that such rules were configured using a user interface, such as a “policy management tool,” in a design environment to input policies and to specify priorities as claimed. EX-1007 p. 14, FIG. 1. Thus, the claimed concept of a “user interface” to enter the various rule criteria, actions, and priority assignments is obvious and not independently patentable.

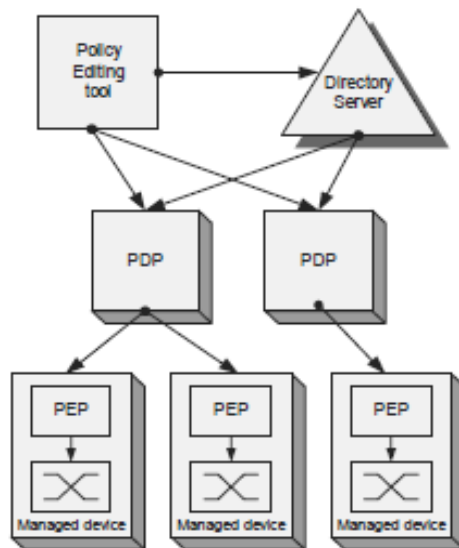


Figure 1. The Policy-Based Networking basic schema

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210. Poh's PIRS includes an I/O interface for input/output of data and rules from/to the MPR. EX-1004 15:33-16:3. Moreover, network operators specify the PIRS policy reconciliation and rules determination instructions (policy enforcement priority rule) that define the priority assignments for the service plan components. EX-1004 19:49-20:36. Thus, a POSA would understand Poh to teach, including rendering obvious, a user interface in a design environment for the operator to specify the priority rules as claimed. Using a user interface to specify particular data for use in a computer program is not patentable.

211. Furthermore, Poh expressly describes that policies stored at the MPR can be updated at any time by network operators which a POSA understood would include a user interface in a design environment for the operator to specify the policies, rules, subscriber data, and subscription data to the MPR (a user interface for a service plan design environment that provides for entering the policy enforcement priority rule in the design environment). EX-1004 16:62-67. Poh further describes that a precedence (priority rule) can be ascribed to the policy (defining the first or second service plan component as belonging to a service type that has an implied or literal

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ordering). EX-1004 19:65-20:25. For example, as discussed with claim 5, the MPR categorizes the policies and can correlate the subscriber specific policies with other policies. EX-1004 18:9-25. A POSA understood that in order to correlate the global subscriber policy for roaming, with the subscriber profile data that identified service related roaming entitlements, the system needs to determine whether a subscriber is roaming first, before determining what service entitlement are accessible. Thus, this correlation would be the precedence or the order of applying the plans that are stored in the MPR (defining the first or second service plan component as belonging to a service type that has an implied or literal ordering).

- i) **Claim 12 The network service plan provisioning system of claim 1, wherein the information specifying the first traffic classification filter comprises an inspection criterion selected from a group of inspection criteria consisting of: a specific device application, a specific network destination, a specific network source, a specific traffic type, a specific content type, a specific traffic protocol, and a combination of two or more of the inspection criteria.**

212. Poh discloses several examples wherein information specifying the first traffic classification filter comprises inspection criteria including accessing operator defined service or applications (specific device application, specific content type, specific traffic type, specific traffic

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protocol) EX-1004 12:23-39, 14:56-63, 18:9-25, malicious users (specific network destination) EX-1004 23:44-63, malicious/abusive users (specific network source) EX-1004 24:24-38, session initiation protocol (SIP) (specific traffic protocol) EX-1004 14:56-63, and roaming (specific traffic type) EX-1004 12:23-39.

- j) **Claim 13 The network service plan provisioning system of claim 1, wherein the first or second policy enforcement action is an action selected from a group of actions consisting of: apply a traffic control policy; apply a service usage accounting, charging, or billing policy; apply a service notification policy; and a combination of two or more of the actions.**

213. Poh discloses several examples wherein the first or second policy enforcement action is an action applying a charging policy (charging or billing policy) (EX-1004 12:9-17); alter a QoS (traffic control policy) (EX-1004 14:17-24); deny/restrict/allow traffic (traffic control policy) (EX-1004 claim 3, 21:22-24); trigger a notification (service notification policy) (EX-1004 14:25-35).

- k) **Claim 22 The network service plan provisioning system of claim 1, wherein the first service plan component further comprises an additional policy enforcement action to augment the first policy enforcement action, and wherein the second service plan component further comprises the**

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**additional policy enforcement action to augment the second
policy enforcement action.**

214. As described with respect to Claims 1 and 2, Poh in combination with Maes discloses that rules can be arranged in any sequence, with any combination of conditions and actions, to effectuate the business objectives of the policy or policies. EX-1005 [0023]. Using the examples discussed in Claim 4, the first service plan component can include an additional policy enforcement action to augment the first policy enforcement action by altering the QoS of a subscriber while roaming, and the second service plan component includes the additional policy enforcement action to augment the second policy enforcement action by charging for the altered QoS while roaming.

- l) **Claim 23 The network service plan provisioning system of claim 1, wherein the first service plan component further comprises an additional policy enforcement action to over-ride the first policy enforcement action, and wherein the second service plan component further comprises the additional policy enforcement action to over-ride the second policy enforcement action.**

215. This limitation is disclosed for the same reasons as discuss respect to Claim 4. As detailed in Poh and in claims 1 and 4, Poh allows for a precedence such that one of the rule levels (operator, global, individual

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subscriber) may override the other rule levels for different rules and thus discloses this claim.

216. For example, this is shown by the first service plan does not allow roaming, and the subscriber overrides the policy enforcement action by requesting roaming (additional policy enforcement action to over-ride the first policy enforcement action), and the second enforcement action is overridden by charging for the allowed roaming (additional policy enforcement action to over-ride the second policy enforcement action). The same set of over-ride actions can apply to other actions such as overriding usage thresholds or denial/allow/restrict service actions.

217. Similarly, Poh discloses such overrides in its policy reconciliation and prioritization actions discussed for element [1.3] and claim 2. EX-1004 19:29-20:25; 20:37-54. This process determines if one particular rule should have “precedence” over another rule. One instance of precedence is overriding the first rule. Poh gives an example of an operator rule allowing SMS, but another rule denying SMS and therefore the second rule overrides the first rule. EX-1004 20:10-23. This reconciliation/precedence

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processing allows for a second action to override a first action for any of the specified service plan components.

m) Claims 30-33, and 35-41

218. Claims 30-33 and 35-41 all ultimately depend from Claim 1 and further limit the “process the first and second service plan components” step to generate provisioning instructions for various combinations of when the first and second traffic classification filters are applied, scenarios in which one or other or both filters match traffic characteristics, when the first and second traffic enforcement policies are enforced, and scenarios in which one or the other or both policy enforcement actions are enforced. These claims are disclosed by Poh in combination with Maes for the same reasons discussed with Claims 1 (in particular element [1.3]) and 2 regarding policy reconciliation, precedence and prioritization as well as the generation of instructions reflecting that reconciliation and precedence. Moreover, these claims merely reflect design choices in implementation of different permutations of known evaluations. Such design choices are not patentable.

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219. Maes discloses that an operator defines business objectives, reflects those business objectives in policies and those policies are enforced through rules. Maes discloses that policies can include “any combination of rules, including any combination of conditions and actions” and workflows or business processes can “describe sequences in which rules are executed, or how conditions may be combined with action to enforce the one or more policies on a communication.” EX-1005 [0025]. “A workflow or business process includes a logical combination of one or more conditions to be satisfied and one or more actions to be executed to enforce or evaluate the one or more policies. In this manner, complex, hybrid, and/or merged topologies are possible.” EX-1005 [0025]. These claims merely reflect different “combination of rules, including any combination of conditions and actions” disclosed in Maes and are thus obvious under the proposed combination.

220. Further, Maes discloses that policies can take on complex nested policy arrangements to implement desired objectives and that “each policy ... may itself be composed of multiple policies, which further evaluate conditions and/or perform actions.” EX1005 [0025] (citing EX-1011 3:13-

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17). Essentially, any logical arrangement of conditions and actions is possible including specifying actions that are to be executed only in the event a condition is/is not satisfied. The conditions may also be based on the result of previous evaluations and/or actions performed. EX-1011 4:37-47; 1:48-50; 5:4-5; 6:8-11; 6:37-62.

221. Each limitation recited in Claims 30-33 and 35-41 include specific combinations and sequences of conditions (traffic classification filters) and actions (enforcement actions) including specifying actions that are to be executed only in the event a condition is/is not satisfied as expressly taught by Maes. A POSA would be motivated to modify the teachings of Poh with the teachings of Maes to include the combinations and sequences of conditions and actions recited in Claims 30-33 and 35-41 for the reasons specified in the Motivation to Modify Teachings section above.

n) **Claim 90 The network service plan provisioning system of claim 1, wherein the traffic event is associated with a particular destination, a particular application on the wireless end-user device, a content type, a protocol, a port, or an operating system of the wireless end-user device.**

222. Poh, combined with Maes, discloses that a policy trigger event (traffic event) can include a subscriber request for a network resource. EX-1004

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18:26-35. Further Poh discloses that many different network resources are available to a subscriber including any application or service accessible by the network subscribers (particular application) such as location-based services, presence-based services, music services, video services, mobile television services, and the like (specific content type, particular destination, particular application) as well as malicious or abusive users (particular destination). The resources are made accessible through an Internet Protocol Multimedia System (IMS) that supports IP multimedia applications (Internet protocol (IP) address) within a UMTS wireless communications network to offer their subscribers multimedia services based on and built upon Internet applications, services and protocols, including SIP (specified protocol). EX-1004 14:47-63, 23:24-24:57 (protecting from abusive/malicious user destinations identified by, for example, IP addresses). Moreover, as detailed in Section IV.F.1.b, it was known to a POSA to include events based on destinations, applications, or protocols.

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223. Moreover, Maes clarifies that such policy evaluation rules can include “destination IP address” and type of traffic (protocol, content type). EX-1005 [0034], [0038].

- o) **Claim 91 The network service plan provisioning system of claim 1, wherein the traffic event is associated with a specified remote destination, a specified application, a specified operating system, a specified content, a specified protocol, or a specified port number.**

224. This limitation is disclosed for the same reasons discussed with respect to Claim 90.

- p) **Claim 92 The network service plan provisioning system of claim 91, wherein the specified remote destination is identified by a domain or an Internet protocol (IP) address.**

225. This limitation is disclosed for the same reasons discussed with Claim 90.

- q) **Claim 93 The network service plan provisioning system of claim 91, wherein the specified application is identified by a name, a hash, a certificate, or a signature.**

226. This limitation is disclosed for the same reasons discussed with Claim 90 where the application is a specified location-based service, presence-based service, music service, video service, mobile television service, and the like. EX-1004 14:47-63.

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227. A POSA understood that specified services are identified by name, hash, certificate or signature.

r) **Claim 112 The network service plan provisioning system of claim 1, wherein the information specifying the first traffic classification filter or the information specifying the second traffic classification filter comprises a name, a description, a filtering parameter, a launch mechanism, or a combination of these.**

228. Poh discloses this limitation for the same reasons discussed with Claim 1 where the traffic classification filters are based on descriptions of the type of services, e.g., roaming, and this description is also used as a filtering parameter (description, filtering parameter).

229. Moreover, such specifications are obvious because in implementing such filters, there would need to be some identification of the different filters and any such identification would comprise one of the claimed identifiers (such as a description or filtering parameter). Without any identification, for example, there would be no way to perform the policy reconciliation process described in Poh.

s) **Claim 113 The network service plan provisioning system of claim 112, wherein the filter parameter specifies filtering the traffic event by destination, by application, by operating system, by protocol, or by port.**

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230. This limitation is disclosed for the same reasons discussed with Claim
90 (destination, application, protocol).

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B. Ground 2: Claims 8-10, 15, 21, 28, 42, 43, 45, 46, 87-89, 96, 98-99, and 120-121 Are Obvious Over Poh Combined with Maes.

t) Claim 8 The network service plan provisioning system of claim 1, wherein at least one of the one or more policies is dependent on a network state.

231. Poh's policies include being dependent on whether the device is roaming (dependent upon a network state):

a global subscriber policy can be a service aware roaming control policy that can prevent a subscriber from accessing operator-defined services or applications while roaming.

232. EX-1004 12:28-31; FIG. 1.

233. Further, Poh's subscriber profile data and subscription profile data include location information and service related roaming entitlements (dependent upon a network state). EX-1004 12:61-64; 13:9-14, 18:45-60.

234. [This paragraph left intentionally blank].

u) Claim 9 The network service plan provisioning system of claim 8, wherein the network state comprises a congestion state of the wireless access network, a network location, a type of the wireless access network, whether the wireless access network is a roaming network, a routing identifier associated with the wireless access network, or a combination of these.

235. Poh discloses this limitation for the reasons discussed in Claim 8 (e.g., roaming network, location).

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236. Further, Poh’s policies may be based on quality of service (QoS) (comprises a congestion state of the wireless access network). EX-1004 18:26-44. Poh’s disclosure is consistent with the disclosure of the ’543 Patent that the congestion state includes the QoS class settings of packet error rate, jitter and delay settings, queue settings, and tag settings. EX-1001 38:28-35. Also, Poh discloses that the policies may be related to different “networks” which renders obvious a type of the network. EX-1004 18:13-16, 13:47-55 (specific application policies for legacy networks).

237. [This paragraph left intentionally blank].

- v) **Claim 10 The network service plan provisioning system of claim 9, wherein the congestion state is based on a time of day, a measure of network congestion, a measure of a delay, a measure of a jitter, a packet error rate, or a combination of these.**

238. Poh discloses this limitation for the reasons discussed in Claim 9. A POSA understood that QoS class settings include packet error rate, jitter, delay settings and time window parameters. EX-1001 38:28-35. A POSA would recognize that “Standardized QoS characteristics” were known to include “packet delay budget” (delay settings) and “packet error loss rate”

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(packet error rate) as those concepts had been standardized long prior to the

‘543 Priority Date. EX-1010, Section 6.1.7.2.

239. [This paragraph left intentionally blank].

- w) **Claim 15 The network service plan provisioning system of claim 1, wherein the one or more network elements are further configured to include in the network provisioning instruction set an instruction to assist in enforcing a classification-based charging policy, wherein the classification is selected from the group of classification categories consisting of: application, destination, network, time of day, congestion state, quality of service, content type, and a combination of two or more of the classification categories.**

240. Poh discloses this limitation.

241. As discussed with respect to limitation [1.4] and [1.5], the PIRS and PCPS generate instructions that are provided to the PCEF, PCRF and ISGW for enforcement. Poh discloses that the PCRF is a decision point function in the network layer for control, altering of Quality of Service (QoS), and providing dynamic or personalized charging rules at a subscriber level (an instruction to assist in enforcing a classification-based charging policy). Poh’s classifications include roaming control, and based upon the subscriber entitlements, subscriber prohibitions, and/or subscriber and subscription profile data, 124. EX-1004 14:17-24. Poh’s “policy trigger”

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includes a “request for a network resource such as a ... service, [or] a QoS.”

EX-1004 18:30-32. The subscriber profile data includes service related roaming entitlement (an instruction to assist in enforcing a classification-based charging policy). EX-1004 13:9-15. For example, the classification can include an “application” such as “SMS.” EX-1004 20:9-25. Indeed, Poh gives a specific example of using two classifications. EX-1004 12:31-32. (“policy that can prevent a subscriber from accessing operator-defined applications (applications) while roaming (network)”). See also EX-1004 14:29-32 (QoS / application).

242. Thus, a POSA understood that Poh’s PCPS can include provisioning instructions to assist in enforcing a classification-based charging policy using multiple of the claimed classifications.

243. [This paragraph intentionally left blank].

- x) **Claim 21 The network service plan provisioning system of claim 1, wherein the one or more network elements are further configured to facilitate reuse of the first service plan component, the second service plan component, the first traffic classification filter, the second traffic classification filter, the first policy enforcement action, or the second policy enforcement action in a plurality of service plans by storing the first service plan component, the second service plan component, the first traffic classification filter, the second traffic classification filter, the first policy**

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**enforcement action, and the second policy enforcement
action as one or more objects in a catalog.**

244. As described with respect to Claim 1, MPR is the master policy repository storing the first service plan component, the second service plan component, the first traffic classification filter, the second traffic classification filter, the first policy enforcement action, and the second policy enforcement action. The MPR receives, retrieves, accesses, organizes, and/or manages operator policies and global subscriber policies. EX-1004 11:53-56.

245. Poh does not provides the details of the structure of the MPR. However, the '543 Patent describes that its database model storing provisioning plans is “one of the more common models in use today” being data structures including “fields, records, files, objects, and any other applicable known or convenient structures for storing data.” EX-1001 11:3-13.

246. Thus, a POSA would be motivated to implement a data structure having the policies stored as objects in a catalog because it uses one of the most commonly “known” models in use at the time the '543 Patent was filed. Using a “catalog” is merely one of a limited number of design

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choices known to a POSA for which implementation of the profile data would be obvious.

247. Further, Poh discloses that the subscription profile data, which can be stored in the MPR or retrieved from ESPR, can include:

The subscription profile data can include all available service plans offered by an operator as defined, maintained, and updated, for example, by operator service offer management personnel. Service plans can include various categories, such as data rate plans for stand alone or integrated network cards for use in computer systems (e.g., laptop computers), data rate plans with voice plan add-ons, data rate plans combined with voice plans, international voice plans, international data plans, pooled plans, government plans, WiFi add-on plans, device-specific plans, push email plans, business plans, media bundles, global positioning system (GPS) plans, any combination thereof, and the like. Each service plan can have normal operation and roaming entitlements for domestic and international plans. Roaming entitlements enable the operator to provide flat rate service plans for international roaming as defined by thresholds, country, and roaming operator.

248. EX-1004 13:36-59. A POSA understood that this subscription profile data is a catalog containing the components recited in claim 21 as objects

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because such objects were a known implementation that allowed for ready
access and retrieval of objects stored in computer data structures.

249. [This paragraph left intentionally blank].

- y) **Claim 28 The network service plan provisioning system of claim 1, wherein the one or more network elements are further configured to obtain service plan parameters for multiple service plans, combine one or more service policies for the multiple service plans into one composite-plan policy set, and provision the network policy enforcement system to enforce the composite policies for the multiple service plans.**

250. Poh discloses composite policies for multiple service plans. For example, Poh discloses “add-on” and “combined” plans. EX-1004 13:36-59 (quoted above in claim 21 analysis).

251. Moreover, as described with respect to Claim 1, Poh describes how to evaluate multiple plans to develop enforcement rules, and the PCPS generate provisioning instructions to implement the combined plans (provision the network policy enforcement system to enforce the composite policies for the multiple service plans). EX-1004 14:4-10; 16:28-31.

252. [This paragraph left intentionally blank].

- z) **Claim 42 The network service plan provisioning system of claim 1, wherein the network policy enforcement system comprises a policy decision element.**

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253. Poh's PCRF is part of the *network policy enforcement system* as described with respect to Claim 1. Poh's PCRF is a decision point function (*policy decision element*). EX-1004 14:17-24. Moreover, Poh's PCEF and ISGW execute network policy enforcement actions defined in policy enforcement provisioning instructions that are triggered by traffic matches and thus are or include a policy decision element. See [1.2], [1.3] and [1.5].

254. [This paragraph left intentionally blank].

aa) **Claim 43 The network service plan provisioning system of claim 1, wherein the network policy enforcement system or the network traffic inspection system comprises a gateway.**

255. Poh discloses this limitation for the reason discussed for Claim 1. Poh's PCEF is an enforcement point function that can reside in gateway 130 (network policy enforcement system ...comprises a gateway). EX-1004 14:46-39; FIG. 1. Further Intelligent Security Gateway (ISGW) 138 is a gateway. EX-1004 15:30-32, FIG. 1.

256. [This paragraph left intentionally blank].

bb) **Claim 45 The network service plan provisioning system of claim 1, wherein at least a portion of the network policy enforcement system is in a network system communicatively coupled to the wireless end-user device over the wireless access network.**

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257. Poh discloses that the PCEF and ISGW are an enforcement point functions that can reside in gateway which is in communication with one or more end user devices (at least a portion of the network policy enforcement system is in a network system communicatively coupled to the wireless end-user device over the wireless access network). EX-1004 14:46-39; 14:64-67; 23:8-11; FIG. 1.

258. [This paragraph left intentionally blank].

cc) **Claim 46 The network service plan provisioning system of claim 1, wherein the network traffic inspection system or the network policy enforcement system comprises a programmable element.**

259. As described with respect to claim 1, PCRF, PCEF and ISGW are: (1) part of the enforcement system, and (2) programmable. EX-1004 3:36-39; 9:16-24; 22:50-23:6; FIG. 10.

260. [This paragraph left intentionally blank].

dd) **Claim 87 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a traffic control policy.**

261. Poh discloses this limitation for the reasons discussed for Claims 1, 8 and 15. For example, Poh discloses a roaming policy (a traffic control policy).

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262. Poh's disclosure is consistent with the disclosure of the '543 Patent that describes a traffic control policy that permits or prevents roaming to another network. EX-1001 8:66-67.

263. [This paragraph left intentionally blank].

ee) **Claim 88 The network service plan provisioning system of claim 87, wherein the control policy specifies to allow, block, throttle, delay, or defer the traffic event.**

264. Poh's policies' actions include those that restricts access, (*throttle*), deny access, (*block*), and an allow access (*allow*) to the requested service. EX-1004 5:20-24, 11:26-34, 12:23-33, 18:35-44, claim 3.

ff) **Claim 89 The network service plan provisioning system of claim 87, wherein the traffic control policy is based on a network state, a device state, a service-plan-usage state, or a combination of these.**

265. Poh discloses this limitation for the same reason as discussed with respect to Claims 8, 9 and 87, for example, where the network state is roaming or usage thresholds.

266. [This paragraph left intentionally blank].

gg) **Claim 96 The network service plan provisioning system of claim 1, wherein the first service plan component or the second service plan component comprises a carrier component, a network protection component, an**

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**application component, a sponsored component, a
subscriber-paid component, a marketing interceptor
component, a parental control component, a bulk
component, a post-bulk component, or an end-of-life
component.**

267. Poh discloses this limitation.

268. Poh discloses a broad variety of policies, including operating policies
and subscriber policies, each of which can include a component in one or
more categories recited in the claims:

Operator policies can include native operator policies and/or shared
operator policies (*a carrier component, a network protection
component*), such as, but not limited to, gating control policies, data
throttling policies, packet inspection policies (*a network protection
component*), security policies (*a network protection component*),
privacy policies, emergency policies, charging policies, application-
specific policies (*an application component*), global application
policies, service-specific policies, global service policies, content
provider policies, legacy policies, and the like. Operator policies can
be defined and approved by operator personnel. Such as, for example,
operator stakeholders, engineers, technicians, business users, and the
like.

269. EX-1004 11:57-67.

270. [This paragraph left intentionally blank].

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hh) **Claim 98 The network service plan provisioning system of claim 1, wherein the first service plan component or the second service plan component is associated with a service class.**

271. Poh discloses this limitation.

272. Poh describes that subscriber policy-related data includes service entitlement, service prohibition, and other subscriber profile data (service class). For example, the subscriber policy related data includes rate plans, rate plan categories, service entitlement for rate plan or rate plan categories, pre-emption priorities for differential charging or treatment types, and service related roaming entitlement for prepaid or postpaid payment types, as well as class of service (CoS) (service class) entitlement for messaging, such as short message service (SMS) and multimedia message service (MMS) messaging, as well as other network services. EX-1004 13:9-27.

273. [This paragraph left intentionally blank].

ii) **Claim 99 The network service plan provisioning system of claim 98, wherein the service class is paid, marketing intercept, carrier, network protection, sponsored, parental control, open access, bulk, post-bulk, or a combination of these.**

274. Poh discloses this limitation for the reasons discussed for Claims 98, e.g., prepaid or postpaid rate plans (paid).

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jj) **Claim 120 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a policy associated with a tethering function.**

275. Poh discloses this limitation. As an initial matter, the '543 Patent does not include a description of a tethering function; it only shows up in the claims. However, a POSA understood that tethering allows a device (e.g., laptop computer) to use a separate device for network access. Poh discloses “Service plans can include various categories, such as data rate plans for **stand alone** or integrated network cards for use in computer systems (e.g., laptop computers), ..., WiFi add-on plans.” Poh’s plans for a “stand alone ... network card[]” discloses the claimed tethering function because the “stand alone card” would be tethered to the laptop either through a connection such as USB or the disclosed “WiFi add-on plan” (*a policy associated with a tethering function*). EX-1004 14:65-15:7; 13:38-59.

kk) **Claim 121 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a policy associated a web page, a domain, an application, a roaming network, an e-mail service, a networking service, a music**

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**download service, a video game service, a multimedia
service, or a combination of these.**

276. Poh discloses several examples of the claimed policies. For example,

Poh discloses policies associated with:

- *a roaming network* (EX-1004 12:29-39; 13:50-59);
- *e-mail service* (EX-1004 13:41-59);
- *an application* (EX-1004 12:17-22; 14:47-55);
- *a music download service* (EX-1004 14:48-51);
- *a multimedia service* (EX-1004 14:51-55).

277. [This paragraph left intentionally blank].

**C. Ground 3: Claims 16, 44, 47, 57-66, 68-72, 80 and 85-86 Are
Obvious Over Poh in view of Maes in further view of Burnett.**

1. Burnett

278. Burnett is directed to a system and method for allowing a wireless subscriber to dynamically update their service plan. Specifically, the system provides the subscriber with a notification via SMS and email that includes a service plan update offer. In response to the update offer, the subscriber indicates whether it accepted or declined the offer. The system

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updates the service plan for the subscriber as applicable. EX-1012 1:64-2:12; 2:23-27; 2:28-46.

2. Motivation To Combine Poh, Maes and Burnett.

279. A POSITA would have been motivated to combine this references with a reasonable expectation of success. Poh and Burnett: (1) have a same inventor (Lisuan Poh); (2) were filed by the same leading technology company (AT&T); (3) were filed within a few months of each other; and (4) describe overlapping implementations of the same technology (policy enforcement in a wireless network). Poh presents an overall description of the policy enforcement including subscribers managing their subscriptions. Burnett (with the same inventor) provides further details of how subscribers dynamically manage their subscriptions to add or enhance their services. Effectively, Poh and Burnett are two complementary pieces of an overall subscription management system. The proposed modification is that Poh's disclosure (including its existing subscriber management options) is augmented to include the specific disclosure of Burnett allowing for notification and dynamic modification of subscriber profiles.

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280. A POSA would be further motivated to make such modification because Poh discloses that it tracks usage by a subscriber and offers dynamic charging using charging thresholds, and also provides notification to a subscriber related to an enhanced charged rate, and Burnett expressly discloses that it would be mutually beneficial to the subscriber and the service provider to offer to upgrade or downgrade a subscriber's service plan based upon subscriber history and subscriber usage data. EX-1004 14:20-35; EX-1012 1:42-45; 7:40-53.

281. A POSA understood that it would be a simple software modification to present an option to a subscriber to accept or decline a subscription update offer using a wireless phone or computer and thus have a reasonable expectation of success.

282.

3. Detailed Application of Poh, Maes, and Burnett to these

Challenged Claims

- II) **Claim 16 The network service plan provisioning system of claim 1, wherein the one or more network elements are further configured to include in the network provisioning instruction set an instruction to assist in presenting a service buy page notification with an actionable response.**

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283. As discussed with respect to Claim 1, the PIRS and PCPS generate provisioning instructions that are sent to PCRF and PCEF. Some of those instructions are related to charging the subscriber to assist in presenting a service buy page notification with an actionable response. For example, Poh's PCRF can also trigger messages and/or notifications to subscribers for events such as, for example, differential charges, or if the PCRF is triggered to treat the subscriber differently than the subscriber's expected treatment (presenting a service buy page notification). Furthermore, the PCRF can note that an enhanced charge rate, dropped IP flow, and/or QoS change will be invoked for a service or application. Upon such a determination, the PCRF, PCEF or OCF can trigger a notification to a subscriber relating to the change. EX-1004 14:25-35.

284. Further, Poh's subscriber can change preferences for various rate plans frequently (an actionable response). EX-1004 21:65-22:3. Thus, a POSA understood that Poh discloses that a subscriber could change a rate plan in response to receiving a notification from the PCRF that an enhanced charge rate will be invoked.

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285. If PO asserts that Poh does not expressly state presenting a service buy page notification with an actionable response, a POSA understood that it would be obvious to modify Poh to include presenting an option to a subscriber to accept or decline a subscription update offer as taught Burnett (presenting a service buy page notification with an actionable response). EX-1012 2:39-46. Burnett’s subscriber option includes presenting the option on the user’s wireless-end user device such as a phone with a user feedback component software for accepting or declining offers. EX-1012 3:63-65, 5:33-47, 7:54-8:24, 9:31-52.

286. In this regard, the Poh/Burnett combination mirrors the ‘543 patent which describes a “notification policy structure” that notifies the user of policy enforcement issues, such as thresholds, expirations, and block events. EX-1001 13:37-14:3. The ‘543 system may present “notification actions” for the user to provide feedback or instructions such as buying or approving plan changes. EX-1001 13:55-14:3. The ‘543 user may also use a “client dashboard” associated with computers connected to the network infrastructure to “buy” additional services. EX-1001 Fig. 9, 29:63-30:45.

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287. Thus, the combination discloses a portion of the policy enforcement system being present on the wireless user's device to allow notifications to the user of policy events and offer the user the option to provide feedback to the enforcement system such as through buying (or declining) offers.

mm) **Claim 44 The network service plan provisioning system of claim 1, wherein at least a portion of the network policy enforcement system is on the wireless end-user device.**

288. The combination discloses this limitation for same reason as Claim 16. For example, a subscriber receives notifications regarding subscriber usage to enforce the subscriber's service plan, including an option to a subscriber to accept or decline a subscription update offer using the wireless end-user device.

289. The user notification/action/feedback system (both in the prior art and in the '543 patent) comprises a portion of the network policy enforcement system. For example, the '543 patent notification system allows for user "feedback" which matches Burnett's "user feedback component software." EX-1001 13:55-14:3; EX-1012, 9:31-52. That "subscriber feedback" is used by the "analytics engine" for policy enforcement. EX-1001 11:55-12:3; 13:55-14:3; 21:49-22:12; 24:45-55; 34:4-15. Indeed, Challenged

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Claim 61 recites that the notification is related to policy enforcement.

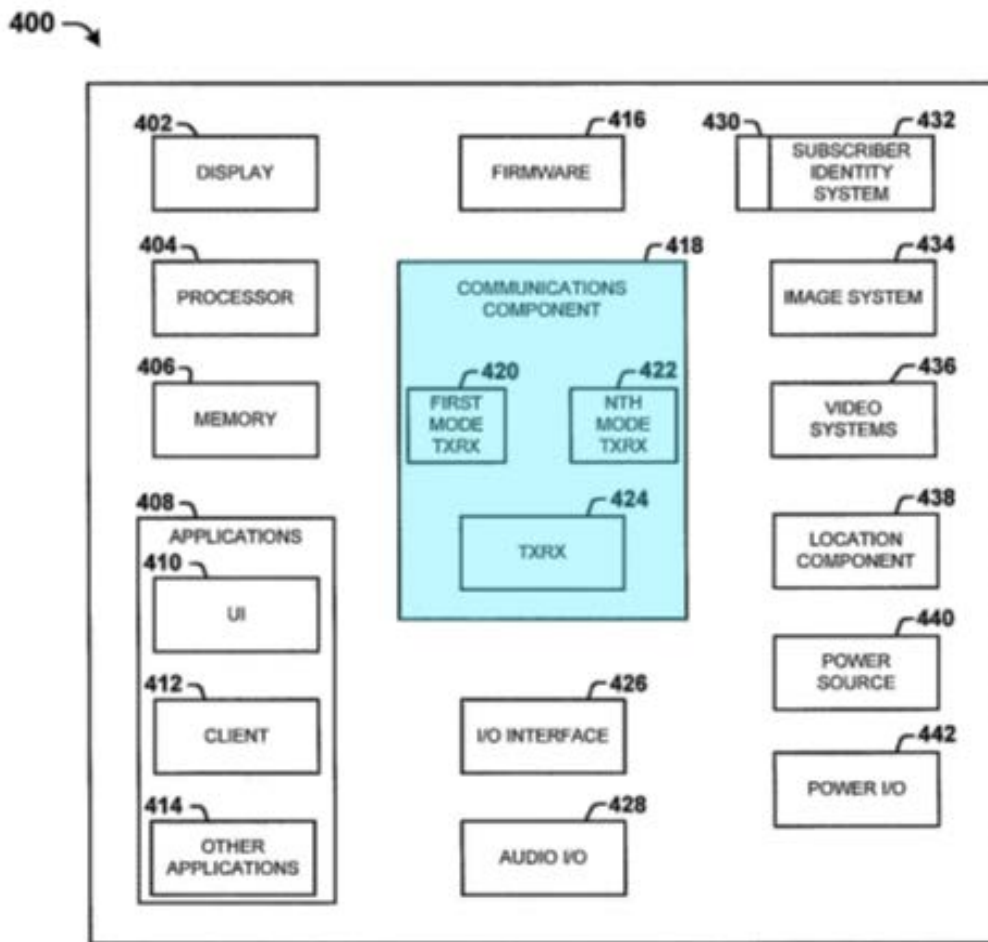
Thus, the Poh/Burnett system for notification and actions such as policy changes mirrors that of the '543 patent.

290. Thus, a POSA understood that the wireless end-user device is a portion of the network enforcement system because it receives notifications relating to the enforcement of the subscriber's service plan and provides the opportunity for the subscriber to change the service plan being enforced.

nn) **Claim 47 The network service plan provisioning system of claim 1, wherein the network policy enforcement system or the network traffic inspection system comprises a modem or an agent on the wireless end-user device.**

291. The Poh/Maes/Burnett combination discloses this limitation for the reasons discussed for Claims 44 and 45. Specifically, the combination discloses that end user device 134 can be a smart phone that uses various wireless access technologies to communicate with gateway 130. EX-1004 14:64-15:24, EX-1012, 3:62-67. Burnett shows such a component:

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292. EX-1012, Fig. 4, 9:53-10:15. Burnett’s transceivers render obvious the claimed “modem” because a POSA would recognize that such transceivers would implement (or that it would be obvious to implement) the modulator/demodulator function (“modem”) necessary for communications in the TX/RX functional block. Moreover, the claimed “agent” is rendered obvious by Burnett’s “applications” (408) which

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include the “user feedback component software for accepting or declining
update offers.” EX-1012, 9:31-52.

293. A POSA understood that the end user device would use a modem to
communicate with the gateway using the wireless access technologies. *See
also* EX-1004 FIG. 10 (showing input/out 1004 through which ISGW 138
communicates); 22:50-53.

oo) **Claim 57 The network service plan provisioning system of
claim 1, wherein the network policy enforcement system
comprises a notification element.**

294. The combination discloses this limitation.

295. Poh discloses several different notification functions. For example,
the PCRF (and/or PCEF) (notification element) includes a notification
function that can trigger messages and/or notifications to subscribers for
events such as, for example, differential charges, or if the PCRF is triggered
to treat the subscriber differently than the subscriber’s expected treatment.
EX-1004 14:17-35.

296. Poh further describes that the system is “further configured to trigger
a notification to notify a subscriber that an action is to be taken. In some
embodiments, the trigger is an online trigger. In some embodiments, the

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trigger is an offline trigger.” EX-1004 8:61-65, 11:48-49, 14:25-35. A POSA understood that the purpose of sending a notification to a subscriber is to inform the subscriber of a change in how the subscriber was being treated and to afford the subscriber to an opportunity to change the subscriber preferences. Poh expressly describes that a subscriber can change preferences frequently, for example, disabling SMS. EX-1004 21:61-22:3. Another example is that the subscriber would be subject to an enhanced charge rate, which a POSA understood would be triggered by exceeding a specified threshold of resources, for accessing a service not included in a service plan or accessing a higher priority service. A subscriber receiving the notification would have the opportunity to accept or deny the charges or change the current service plan. Any change in the subscriber policies would be reflected in new provisioning instructions.

297. Another notification function is that the ISGW (notification element) can send a notification of a security threat to network elements (notification element), and vice versa. EX-1004 9:22-28, 24:57-25:4.

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298. Burnett matches Poh in describing notifications sent from the “service personalization engine” to the “user feedback component software” on the mobile device. EX-1012, 5:24-47, 9:31-52, Figs. 1-5.

299. Further, for the reasons discussed for Claim 16, Poh as modified by Burnett, the PCRF/PCEF (notification element) provides a notification including a subscription offer update presenting an option to a subscriber to accept or decline a subscription update offer.

pp) **Claim 58 The network service plan provisioning system of claim 1, wherein the network policy enforcement system implements a notification function.**

300. The combination discloses this limitation for the reasons for Claim 57.

qq) **Claim 59 The network service plan provisioning system of claim 58, wherein the one or more network elements are further configured to:**

obtain notification information, the notification information at least assisting to specify or identify a notification content, a notification trigger, or a notification offer; and

determine at least a portion of the policy enforcement provisioning instructions based on the notification information.

301. The combination discloses this limitation for the reasons for Claims 1, 16 and 57. The obtained notification information is any of Poh’s received notifications such as the enhanced charge rate, dropped IP flow, and/or QoS

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change and the security threats (e.g., at the ISGW or other network element) and the provisioning instructions are triggered to provide the response (such as the QoS change, charge rate change or responding to the security threat to be blocked (determine at least a portion of the policy enforcement provisioning instructions based on the notification information). They also disclose providing notification content or a notification offer as discussed for Claim 16. EX-1004 14:25-35.

rr) **Claim 60 The network service plan provisioning system of claim 1, wherein the one or more policies comprise a notification policy.**

302. The combination discloses this limitation for the reasons for Claims 1, 16, and 57, where the MPR includes policies regarding notifying a subscriber that an action is to be taken (notification policies), such as for differential charges, dropped IP flows or QoS changes. EX-1004 14:25-35.

ss) **Claim 61 The network service plan provisioning system of claim 60, wherein the one or more policy enforcement provisioning instructions assist in causing a notification to be delivered to a subscriber or to the wireless end-user device.**

303. The combination discloses this limitation for the reasons for Claims 1, 57 and 60.

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- tt) **Claim 62 The network service plan provisioning system of claim 61, wherein the notification comprises a selection option for providing feedback or instructions.**

304. The combination discloses this limitation for the reasons for Claims 1, 16, 57, 60 and 61, where the notification includes an enhanced charge rate and an opportunity to accept or deny it through subscriber plan changes.

- uu) **Claim 63 The network service plan provisioning system of claim 61, wherein the notification indicates that a usage of a service plan has reached a particular percentage of a limit, or that a requested network activity has been capped because a policy limit has been reached.**

305. The combination discloses this limitation for the reasons discussed for Claims 1, 16, 57, 60 and 61, where an enhanced charge rate is tied to exceeding a specified usage threshold of a service plan. EX-1004 14:17-35.

- vv) **Claim 64 The network service plan provisioning system of claim 61, wherein the notification provides information about a service plan limit or an overage.**

306. The combination discloses this limitation for the reasons discussed for Claim 63.

- ww) **Claim 65 The network service plan provisioning system of claim 61, wherein the notification provides information about an offer.**

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307. The combination discloses this limitation for the reasons discussed for Claims 1, 16 and 57, where the notification offers the subscriber the option to change the service plan.

xx) **Claim 66 The network service plan provisioning system of claim 65, wherein the offer is an offer to allow an overage, an offer for a new service plan, or an offer to block an ongoing usage.**

308. The combination discloses this limitation for the reasons discussed for Claim 65.

yy) **Claim 68 The network service plan provisioning system of claim 61, wherein the notification provides information about an activity of the wireless end-user device that has been blocked, or an activity of the wireless end-user device that is not allowed.**

309. The combination discloses this limitation for the reasons discussed for Claim 57, where the notification is a dropped IP flow. EX-1004 14:25-35.

zz) **Claim 69 The network service plan provisioning system of claim 61, wherein the notification provides a message or an offer based on a current activity or a status of the wireless end-user device.**

310. The combination discloses this limitation for the reasons discussed for Claims 1, 16, 57, 60 and 61. EX-1004 14:17-35.

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aaa) **Claim 70 The network service plan provisioning system of claim 69, wherein the current activity or the status of the wireless end-user device is based on the traffic event.**

311. The combination discloses this limitation for the reasons discussed for
Claim 69.

bbb) **Claim 71 The network service plan provisioning system of claim 61, wherein the notification is an actionable notification enabling a user of the wireless end-user device to provide a response to the notification.**

312. The combination discloses this limitation for the reasons discussed for
Claims 1, 16, 57 and 60.

ccc) **Claim 72 The network service plan provisioning system of claim 71, wherein the response comprises a directive to dismiss the notification, a directive to cancel the notification, an acknowledgment of the notification, a request for information, or a request to make a purchase.**

313. The combination discloses this limitation for the reasons discussed for
Claims 1, 16, 57, 60, 61 and 71.

ddd) **Claim 80 The network service plan provisioning system of claim 61, wherein the notification comprises an upsell offer.**

314. The combination discloses this limitation for the reasons discussed for
Claims 1, 16, 57 and 60.

eee) **Claim 85 The network service plan provisioning system of claim 61, wherein the notification comprises information**

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**about a purchase, a data usage, an application, an amount
of data, a percentage, or a combination of these.**

315. The combination discloses this limitation for the reasons discussed for
Claim 63.

fff) **Claim 86 The network service plan provisioning system of
claim 61, wherein the notification comprises information to
assist a subscriber in activating the wireless end-user device,
selecting a service plan for the wireless end-user device,
setting a preference, or a combination of these.**

316. The combination discloses this limitation for the reasons discussed for
Claims 1, 16, 57 and 60.

317. [This paragraph is left intentionally blank].

**XI. SECONDARY CONSIDERATIONS DO NOT REBUT THE PRIMA
FACIE CASE OF OBVIOUSNESS.**

318. In my opinion, secondary considerations do not rebut the prima facie
case of obviousness for at least two reasons. *First*, I have not seen any
evidence of any secondary consideration to date.

319. Patent Owner never proffered such evidence during prosecution of the
'543 patent.

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320. *Second*, I do not believe that Patent Owner will be able to establish a nexus between any secondary consideration and the Challenged Claims. I have been advised that a nexus does not exist where the alleged secondary consideration results from something other than what is both claimed and novel in the claims.

321. As I explained above, there is nothing novel in the claims. Indeed, all claim elements are disclosed in the prior art as discussed above including in the Scope and Content of the Prior Art. Thus, I do not see a basis for Patent Owner to assert that there is a nexus between any secondary consideration and the claims.

XII. CONCLUSION

322. I may utilize the documents cited and/or listed herein, or portions of those documents, as exhibits at any hearing or trial in this proceeding. I may further prepare and use exhibits that summarize portions of my testimony or key terms or concepts presented therein, or other demonstrative exhibits, at any hearing or trial in this proceeding.

323. I reserve the right to supplement my testimony and this report in response to any judicial determinations, in response to the opinions

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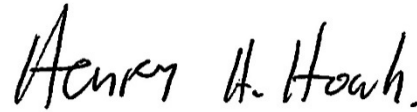
expressed by the Patent Owner's experts in this proceeding, and/or in light of additional evidence or testimony brought forth at trial or otherwise brought to my attention after the date of my signature below.

324. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1004.

IPR2024-01041, IPR2024-01042

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Date: June 20, 2024

A handwritten signature in black ink that reads "Henry H. Houh." The signature is written in a cursive style with a horizontal line at the end.

Henry Houh

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Henry H. Houh

15 Ballard Ter.
Lexington, MA 02420
henry.houh@gmail.com
cell: 781-325-8273

Education

Massachusetts Institute of Technology, Cambridge, MA

- PhD in Electrical Engineering and Computer Science, February 1998. “Designing Networks for Tomorrow's Traffic,” thesis supervised by Professor David Tennenhouse and Professor John Guttag. GPA 4.7/5.0
- Master of Science in Electrical Engineering and Computer Science, February 1991. “Demonstration of a laser repetition rate multiplier,” thesis. GPA 4.5/5.0
- Bachelor of Science in Electrical Engineering and Computer Science, June 1989. “Boundary element analysis of arbitrarily shaped dielectric structures,” thesis. GPA 4.7/5.0
- Bachelor of Science in Physics, February 1990. GPA 4.7/5.0

MITx, Cambridge, MA

- September 2020 – present: Enrolled in Statistics and Data Science MicroMasters program, a sequence of five MIT-offered graduate-level courses in statistics and machine learning, culminating in a MicroMasters certificate. Have completed four of five required courses.

Experience

Houh Consulting Inc. / Independent Consultant

- 2009 - present: Technical consultant specializing in Social Networking, Web 2.0, Web Site Development, Data Networking, Optical Networking, Telecommunications, Media Streaming and Voice Over IP. Clients include: Akin Gump Strauss Hauer & Feld LLP, Arnold & Porter Kaye Scholer LLP, BBN, Baker Botts LLP, Barnes & Thornburg LLP, BBN Technologies, Beus Gilbert McGroder PLLC, Bracewell LLP, Christensen O'Connor Johnson Kindness PLLC, Cooley LLP, Covington & Burling LLP, Cozen O'Connor P.C., DLA Piper, Davis Polk & Wardwell LLP, Desmarais LLP, Duane Morris LLP, Erise IP, P.A., Faegre Baker Daniels LLP, Finnegan, Henderson, Farabow, Garrett

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& Dunner, LLP, Fish & Richardson P.C., Goldman Ismail Tomaselli Brennan & Baum LLP, Haynes and Boone, LLP, Kaye Scholer, Kellogg Huber Hanson Todd Evans & Figel PLLC, Kirkland & Ellis LLP, Klarquist Sparkman, LLP, McCarthy Tetrault LLP, McGuireWoods LLP, Morgan, Lewis & Bockius LLP, Munger Tolles & Olson LLP, Orrick, Herrington & Sutcliffe LLP, O'Melveny & Myers LLP, Orrick, Herrington & Sutcliffe LLP, Paul Hastings LLP, Paul, Weiss, Rifkind, Wharton & Garrison LLP, Perkins Coie LLP, Quinn Emanuel Urquhart & Sullivan, LLP, Sidley Austin LLP, Smith Baluch LLP, Sterne, Kessler, Goldstein & Fox PLLC, Troutman Sanders LLP, Venable LLP, Weil, Gotshal & Manges LLP, Wiley Rein LLP, Wilmer Cutler Pickering Hale and Dorr LLP, and Winston & Strawn LLP.

BlocksCAD Inc. (H3XL spin-out)

- 2014 - present: Founder and member of Board of Directors. BlocksCAD is a visual Computer-Aided Design (CAD) program, designed to teach children mathematics and geometric visualization. BlocksCAD is being used in U.S. schools and worldwide in maker spaces, with 350,000+ users. BlocksCAD was selected to be part of the LearnLaunch 2017 Boost Accelerator, the MIT Play Labs 2018 Summer Accelerator, and the MassChallenge 2018 Boston Cohort. Recipient of DARPA DSO grant in 2014, and SBIR grant from the USDA in 2019.

H3XL Inc. d/b/a Einstein's Workshop (formerly Lexington Robotics)

- 2009 - 2022: Founder and President. Started a science, technology, engineering and math enrichment program and creative/maker space, in 7,000 square feet of space. Serve 2,000+ kids and families annually. As of end of 2022, have delivered an estimated 250,000 student-instruction-hours of STEM courses. Principle Investigator for 2-year DARPA grant to improve 3D Computer Aided Design tool developed in-house for the purposes of teaching 8 year olds and up 3D CAD.

Eons

- 2008 - 2009: Chief Technology Officer. Created product that Eons acquired from BBN Technologies. Integrated BBN product with Eons social networking platform and significantly increased the Eons group creation rate. Helped evaluate advertisement platform offerings and rolled out the "Boom Network" advertising network. Eons raised \$32 million from General Catalyst Partners, Charles River Ventures, Sequoia Capital, and Intel Capital.

BBN Technologies

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- 2007 - 2008: Delta Division, Vice President of Technology. Grew “Boomerang” counter-sniper project engineering team and significantly de-risked \$10 million worth of product deliveries. Identified sales team leading to \$10 million dollars of new sales within 6 months and \$100+ million in additional orders in the following two years. Boomerang was a significant asset leading to the acquisition of BBN by Raytheon in 2009. Created new business plan and grew team; launched new fully-featured social networking web site in 5 months. Served as lead expert witness in patent infringement lawsuit, resulting in \$58 million jury award to client; verdict for patents I testified on were upheld on appeal which resulted in a \$120 million settlement.
- 2004 - 2007: Delta Division, Director of Technology, responsible for commercializing IP and creating new businesses. Hired and grew division's initial engineering team. Wrote three business plans, two of which were funded. For call center business plan, acted as general manager, hiring and managing engineering team, inside sales team, and identifying and recruiting a new general manager. Identified and recruited other key employees to Delta Division, including senior members of team leading to successful internal sales growth and spin-outs of projects. Contracted by BBN to BBN spin-out PodZinger as VP of Operations and Technology. Additional areas studied include mesh networking, network security, satellite communications, and semantic web.

PodZinger Inc. (BBN spin-out, also known as EveryZing and now RAMP)

- 2006: Vice President of Operations and Technology. Significantly upgraded capability of consumer-facing search site and redeployed web site from company to co-location facility. Identified key portions of infrastructure for upgrading and cost reduction. Helped write business plan, evaluating advertisement models of revenue. Hired in operations replacement and phased back to BBN.

Commonwealth Capital

- 2004: Entrepreneur-in-residence (informally), performed technical due diligence on business plans, brainstormed ideas for new businesses with venture partner. With venture partner, left for portfolio company BBN to form core of commercialization team.

Empirix, Inc./Teradyne, Inc.

- 2001 - 2004: Chief Technologist, Engineering Manager, Web Application Test Group. Researched potential new product areas; developed product plan and prototype. Responsible for three new and existing products. Managed off-shore development team. Chief architect for all web testing products. Re-architected core testing product, helped write javascript interpreter. Provided technical vision for core product.
- 2000 - 2001: Chief Technologist, Communication Infrastructure Test Group. Responsible for incorporating new technology internally, tracking new technologies, technical

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evaluation of partnerships and potential acquisitions. Helped develop division strategy. Developed plans which formed core capabilities for successful new products introduced in 2004-5.

- 2000 - 2001: Engineering Manager, Communications Infrastructure Test Group. Execution of new product plan developed in prior role. Grew team from four existing engineers to team of over 30 on immediate team and over 40 on project. Delivered new platform in one year. Platform and derivatives accounted for large portion of booked products for the division within 2 years and is currently (2008) a key portion of new product offerings.
- 2000: Empirix was formed as a spin-out of Teradyne in January 2000. Reported to CEO in carve-out of Empirix from Teradyne.
- 1999: (Teradyne) Director of Business Development, Software Test Units. Reported directly to Chairman of the Board/Founder and then to general manager of software test unit (6 divisions of Teradyne). Evaluated and researched acquisition and partnership candidates. Internally assessed technology position in market and gaps in product lines. Worked with senior division staff to develop new product strategies. Attended internal Teradyne divisional board meetings. Chairman served as my mentor.

3Com Corporation/NBX Corporation

- 1999: Software Engineer 5. Continued work after 3Com acquisition of NBX. Built cross-division relationships for new products and research directions. NBX was acquired by 3Com in March 1999.
- 1997 - 1999: (NBX) Senior Scientist and Engineer. Work in IP Telephony. Architected next-generation product. Protocol design and validation for core protocol now used tens of millions of times daily. Led team in integration of IP protocols into current product. Designed audio reconstruction algorithms. Developed applications for bug analysis and diagnosis of system problems. Implementation of network simulator. Work on collaborative projects with external partners. Worked to identify gaps in product. Representative at numerous trade shows. Innovated novel methods of using product.

MIT Department of Electrical Engineering and Computer Science, Cambridge, MA

- 1991 - 1998: Research assistant, Telemedia Network Systems Group. Design, development, and implementation of Gigabit ATM network for distributed multimedia system. Studied host interface design issues. ATM network simulation.
- Spring 1989, Fall 1990, Spring 1995: Teaching assistant, Computation Structures digital systems course. (Spring 1995 Head TA)
- 1988 - 1989: Head laboratory teaching assistant for Computation Structures. Responsibilities included writing and revising lab assignments, and maintaining the lab.
- 1987: Laboratory teaching assistant for Computation Structures.
- 1987: Design, construction, and programming of 16-bit computer.

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Agora Technology Group, Incorporated

- 1994 - 1996: Founder and CEO. Conceived and oversaw development of targeted advertising-supported Web sites. Responsible for company's vision and direction. Attended the first two WWW Conferences, presenting a workshop and paper at the first, and appearing on the “Commercialization and Economics of the Web” panel and chairing the “Where Commercial Services and the Web Are Headed” panel at the second. Sold company intact; is currently an operating stand-alone company.

AT&T Bell Laboratories, Holmdel, NJ

- 1989 - 1990: Implementation of cascadable all-optical fiber logic gate. Modelocking of all-fiber erbium laser. Construction of modelocked laser repetition rate booster. Strong optics laboratory and fiber optic experience.
- Summer 1988, 1987: Research in integrated optics. Analysis of rectangular waveguides using microwave modeling. Fabrication of integrated optical components.

Honors

- MIT Alumni Association Great Dome Award, 2010, Baker 60th Anniversary Reunion Co-Chair (highest group award given by MIT Alumni Association)
- MIT Alumni Association Presidential Citation Award (now known as Great Dome), 2008, Member of MIT Chairman’s Salon committee
- MIT Alumni Association Bronze Beaver Award, 2007 (highest individual award given by MIT Alumni Association)
- MIT Alumni Association Volunteer Honor Roll, February 2004
- MIT Alumni Association Lobdell Award, 1999
- Boston Museum of Science Gold Pin for 1000 hours of Volunteer Service, April 1999
- MIT Alumni Association Presidential Citation Award (now known as Great Dome), 1997, Member of Alumni Online Communications Committee

Patents and Patent Publications

- U.S. Patent #9,697,231, H. Houh, J. Stern, R. Spina, M. Meter, “Methods and apparatus for providing virtual media channels based on media search,” July 4, 2017.
- U.S. Patent #9,697,230, H. Houh, J. Stern, “Methods and apparatus for dynamic presentation of advertising, factual, and informational content using enhanced metadata in search-driven media applications,” July 4, 2017. See also WO2007056485.

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- U.S. Patent #7,975,296, L. Apfelbaum, H. Houh, T. Mayberry and G. Friedman, “Automated security threat testing of web pages,” July 5, 2011. See also US20030159063, WO2003067405.
- U.S. Patent #7,877,736, H. Houh and J. N. Stern, “Computer language interpretation and optimization for server testing,” January 25, 2011. See also US20050138104, WO2005043300.
- U.S. Patent #7,801,910, H. Houh and J. N. Stern, “Method and apparatus for timed tagging of media content,” September 21, 2010. See also US20070112837, US20090222442, WO2007056535.
- U.S. Patent #7,590,542, D. C. Williams, W. C. Hand, H. Houh, A. R. Seeley, “Method of Generating Test Scripts Using a Voice-Capable Markup Language,” September 15, 2009. See also EP1530869, US20030212561, WO2003096663.
- U.S. Patent #6,967,963, H. H. Houh, P. Anderson, C. Gadda, “Telecommunication method for ensuring on-time delivery of packets containing time-sensitive data,” November 22, 2005. See also EP1060400, WO2000033092, CA2318774.
- U.S. Patent #5,144,375, M. C. Gabriel, H. H. Houh, N. A. Whitaker, “Sagnac Optical Logic Gate,” September 1, 1992. Also issued as European Patent # EP0456422, July 23, 1997, German Patent #DE69126913, August 28, 1997
- U.S. Patent Application Publication No. 20020015387, “Voice Traffic Packet Capture and Analysis Tool for a Data Network” (Abandoned in 2007)
- U.S. Patent Application Publication No. 20020016708, “Method and Apparatus for Utilizing a Network Processor as Part of a Test System” (Abandoned in 2007)
- U.S. Patent Application Publication No. 20020016937, “Method and Apparatus for Utilizing a Network Processor as Part of a Test System.” (Abandoned in 2007) See also WO2002011413.
- U.S. Patent Application Publication No. 20070106646, “User-directed navigation of multimedia search results” (Abandoned in 2009)
- U.S. Patent Application Publication No. 20070106660, “Method and apparatus for using confidence scores of enhanced metadata in search-driven media applications” (Abandoned in 2009)
- U.S. Patent Application Publication No. 20070106685, “Method and apparatus for updating speech recognition databases and reindexing audio and video content using the same” (Abandoned in 2015)
- U.S. Patent Application Publication No. 20070118873, “Methods and apparatus for merging media content” (Abandoned in 2015)
- U.S. Patent Application Publication No. 20090222442, “User-directed navigation of multimedia search results” (Abandoned in 2016)
- U.S. Patent Application 11/395,732, “Search snippet creation for audio and video data” (Abandoned in 2009)
- U.S. Patent Application 11/774,931, “Methods and apparatus for managing a social networking web site”
- U.S. Patent Application 11/774,947, “Methods and apparatus for organizing media files”

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- U.S. Patent Application 11/774,956, “Methods and apparatus for managing an online event”
- U.S. Provisional Patent Application 61/086,909, “Measuring and ranking relationship activity”
- U.S. Provisional Patent Application 61/086,914, “Detecting media object commonality”
- U.S. Provisional Patent Application 61/086,904, “Message categorization based on message characteristics”
- U.S. Provisional Patent Application 61/086,905, “Photo tagging to request action”

Trials, Testimony and Depositions

- Case No. 1:06CV682 (CMH/BRP), Verizon vs. Vonage, U.S. District Court for the Eastern District of Virginia, filed expert report, was deposed and testified at trial.
- Case No. 1:08CV157 (CMH/TRJ), Verizon vs. Cox, U.S. District Court for the Eastern District of Virginia, was deposed and testified at trial.
- Case No. 5:09-cv-476, Two-Way Media vs. AT&T, U.S. District Court for the Western District of Texas, filed expert report, testified at trial.
- Case No. 2:10-cv-248 (RAJ/FBS), ActiveVideo Networks vs. Verizon, U.S. District Court for the Eastern District of Virginia, filed expert report and was deposed as an expert witness.
- Case No. 1:11-cv-00880-TSE-JFA, Bear Creek Technologies, Inc. vs. Verizon Services Corp., et al, U.S. District Court for the Eastern District of Virginia, was deposed as an expert witness.
- Case No. 3:10-CV-298-BBC, AlmondNet, Inc. vs. Microsoft Corp., U.S. District Court for the Western District of Wisconsin, filed expert report.
- Case No. 6:10-cv-00597, Guardian Media Technologies, Ltd. Vs. AT&T Operations, Inc. et al., U.S. District Court for the Eastern District of Texas, Tyler Division, filed expert report.
- Case No. ESCV2010-02282C, The Octopus Solution LLC v. Gary Brown et al., Essex, MA Superior Court, testified at trial.
- Investigation No. 337-TA-882, In the matter of Certain digital media devices, including televisions, Blu-ray disc players, home theater systems, tablets and mobile phones, components thereof and associated software, U.S. International Trade Commission, filed expert reports, was deposed and testified at hearing.
- Investigation No. 337-TA-995, In the matter of Certain communications or computing devices, and components thereof, U.S. International Trade Commission, filed expert reports, and was deposed.
- Case No. 8:12-cv-122-LES-TDT, Prism Technologies LLC v. AT&T Mobility LLC, U.S. District Court for the District of Nebraska, filed expert report, was deposed and testified at trial.

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- Case No. 11-2684 (JWL), Sprint Communications Co., L.P., v. Comcast Cable Communications, LLC, et al., U.S. District Court for the District of Kansas, filed expert report and was deposed.
- Case No. 11-2686 (JWL), Sprint Communications Co., L.P., v. Time Warner Cable, Inc., et al., LLC, et al., U.S. District Court for the District of Kansas, filed expert report, was deposed, and testified at trial.
- Case No. 12-487 (SLR), Cox Communications, Inc., et al., v. Sprint Communications Company L.P., et al., U.S. District Court for the District of Delaware, filed expert report and was deposed.
- Case IPR 2014-00039, Microsoft Corporation v. B.E. Technology LLC, U.S. Patent No. 6,628,314. Submitted declaration and cross-examined in deposition.
- Case IPR 2014-00086, Apple, Inc. v. Evolutionary Intelligence, LLC, U.S. Patent No. 7,010,536. Submitted declaration and cross-examined in deposition.
- Case No. 6:11-CV-421, Stragent, LLC v. Intel Corporation, U.S. District Court for the Eastern District of Texas, Tyler Division, deposed and testified at trial as a fact witness.
- IPR2014-01366, IPR2014-01367, IPR2014-01368, Samsung et al. v. Straight Path, submitted IPR declarations and was deposed.
- IPR2015-1006, IPR2015-1007, Cisco v. Straight Path, submitted IPR declarations.
- IPR2014-01457, IPR2014-01459, Microsoft v. Biscotti, submitted IPR declaration and was deposed.
- IPR2016-00302, Apple v. Nonend, submitted IPR declaration.
- IPR2014-00812, Yelp and Twitter v. Evolutionary Intelligence, submitted IPR declaration.
- IPR2015-00307, Cisco v. AIP, submitted IPR declaration.
- Microsoft v. Acacia, submitted IPR declaration.
- IPR2015-00342, AT&T Mobility LLC and Cellco Partnership d/b/a Verizon Wireless v. Solocron, submitted IPR declaration.
- Mediatube v. Bell Canada, Canadian Federal Court, submitted expert report and testified at trial.
- CBM2016-00036, Google v. At Home Bondholder's Liquidating Trust, submitted CBM declaration.
- IPR2016-01198, IPR2016-01201, Apple, Inc. v. VoIP-Pal.com, Inc., submitted IPR declaration and was deposed.
- Case No. 3:14-cv-2824-VC, Trend Micro Incorporated v. Rpost Holdings, Inc., et al, submitted expert report and was deposed
- Akamai v. Limelight Networks, IPR2016-01631, IPR2016-01711, IPR2017-00249, IPR2017-00349, submitted IPR declarations and was deposed
- Hyperlync Technologies v. Verizon Sourcing, No. 650151/2015 New York Supreme Court, submitted declaration and was deposed
- Cascades Streaming Technologies v. Big Ten Networks, submitted expert reports and was deposed

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Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

- Klaustech, Inc. v. Google LLC., Case No. 4:10-CV-05899-JSW (N.D. Cal.), submitted expert report and was deposed
- Cisco v. Uniloc, IPR2017-00198, IPR2017-00058, submitted IPR declarations and was deposed.
- Cisco v. Uniloc, IPR2017-00597, submitted IPR declaration and was deposed
- Twitter v. Youtoo Technologies, LLC, IPR2017-01133, IPR2017-01131, submitted IPR declarations and was deposed
- Taser International Inc. (now Axon Enterprise, Inc.) v. Digital Ally Inc., IPR2017-00375, submitted IPR declaration and was deposed
- Taser International Inc. (now Axon Enterprise, Inc.) v. Digital Ally Inc., IPR2017-00376, IPR2017-00515, IPR2017-00775, submitted IPR declarations
- HTC Corporation v. IPA Technologies, IPR2018-00306, IPR2018-00307, submitted IPR declaration
- Hulu v. Soundview, IPR2018-00864, IPR2018-01023, submitted IPR declarations and was deposed
- XpertUniverse v. Cisco, 3:17-cv-3848, U.S. District Court for Northern District of California, submitted declaration in support of claim construction and was deposed
- Improved Search v. Microsoft, C.A. No. 16-cv-650-JFB-SRF (Del.), submitted declaration in support of claim construction
- Apple v. Uniloc, IPR2018-00361, IPR2018-00394, IPR2018-00395, IPR2019-00700, IPR2019-00701, IPR2019-01667, submitted IPR declarations
- LG Electronics v. Uniloc, submitted IPR declaration
- SRC Labs and Saint Regis Mohawk Tribe v. Microsoft, 2:18-cv-00321-JLR, U.S. District Court for Western District of Washington at Seattle, submitted declaration in support of claim construction and was deposed
- Verizon Wireless v. Barkan Wireless IP Holdings LP, submitted IPR declarations
- Verizon Wireless and Samsung Electronics America Inc. v. Barkan Wireless IP Holdings LP, IPR2019-199, IPR2019-200, IPR2019-234, IPR2019-631, IPR2019-632, submitted IPR declarations
- Samsung Electronics America Inc. v. Barkan Wireless IP Holdings LP, IPR2019-100, submitted IPR declaration
- Cisco Systems Inc. v. Meetrix IP LLC, IPR2019-539, IPR2019-540, IPR2019-541, IPR2019-542, IPR2019-543, IPR2019-544, submitted IPR declarations
- GMG Products LLC v. Traeger Pellet Grills LLC, PGR2019-24, PGR2019-34, PGR2019-35, PGR2019-36, submitted PGR declaration and was deposed
- Uniloc 2017 LLC v. Google LLC, 2:18-cv-00502-JRG-RSP, U.S. District Court for the Eastern District of Texas, Marshall Division, submitted declaration in support of claim construction
- Microsoft Corporation v. Uniloc 2017 LLC, IPR2020-00102, IPR2020-00103, submitted IPR declarations

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Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

- Microsoft Corporation and HP Inc. v. Syncloud Technologies, LLC, IPR2020-00316, IPR2020-01031, IPR2020-01032, IPR2020-01269, IPR2020-01270, IPR2020-01271, submitted IPR declarations
- Seven Networks, LLC v. Apple Inc, 2:19-cv-115-JRG, U.S. District Court for the Eastern District of Texas, Marshall Division, submitted declaration in support of claim construction
- Unified Patents Inc. v. Ortiz & Associates Consulting, LLC, IPR2019-00743, submitted IPR declaration
- Uniloc 2017 LLC v. Apple Inc., 3:19-cv-01905-JD, U.S. District Court for the Northern District of California, San Francisco Division, submitted declaration in support of claim construction and was deposed
- ClearPlay Inc. v. Dish Network LLC et al.; 2:14-cv-00191, U.S. District Court for the District of Utah, Central Division, submitted expert report and re-examination declarations, was deposed, and testified at trial
- AMC Networks, Inc. et al v. Sound View Innovations, LLC, IPR2020-00482, submitted IPR declaration
- Case No. 1:17-cv-01734-RGA, Sprint Communications Co., L.P., v. Charter Communications, Inc., et al., U.S. District Court for the District of Delaware, filed expert report and was deposed.
- CommScope Technologies LLC et al. v. Barkan Wireless IP Holdings LP et al., IPR2020-00827, IPR2020-00829, IPR2020-00831, IPR2020-00833, IPR2020-00835, IPR2020-00838, submitted IPR declarations
- Cisco Systems Inc. v. Monarch Networking Solutions LLC, IPR2020-01226, submitted IPR declaration
- CoolTV Network.com v. Blackboard, Inc., Facebook, Inc., International Business Machines Corporation, Kaltura, Inc., Limelight Networks, Inc., Microsoft Corporation, Ooyala, Inc., Snap, Inc., and Trapelo Corp., submitted declaration in support of claim construction and was deposed
- Facebook, Inc. v. Onstream Media Corporation, IPR2020-01507, IPR2020-01508, IPR2020-01525, IPR2020-01527, IPR2020-01528, submitted IPR declarations
- Hisense Co LTD. v. Maxell, LTD, IPR2020-01598, IPR2020-01600, submitted IPR declarations
- Microsoft Corp. v. O'Brien, IPR2021-00015, submitted IPR declaration and was deposed
- Sable Networks Inc. v. Cisco Systems, Inc., WA:20-CV-00288-ADA, U.S. District Court for the Western District of Texas, Waco Division, submitted declaration in support of claim construction
- Peloton Interactive, Inc. v. Icon Health and Fitness Inc et al., IPR2021-00342, submitted IPR declaration
- Hulu, LLC v. SITO Mobile R&D IP, LLC et al., CBM2020-00028, IPR2020-00158, IPR2020-00206 , IPR2020-00219 , IPR2020-00265 , IPR2020-00298 , IPR2020-00304 , IPR2020-00308 , submitted CMB and IPR declarations and was deposed

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Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

- Twitter, Inc. and Google LLC v. B.E. Technology, LLC, IPR2021-00482, IPR2021-00483, IPR2021-00484, IPR2021-00485, submitted IPR declarations
- MG Freesites LTD v. ScorpCast, LLC, IPR2021-00511, submitted IPR declaration
- Avionte, LLC v. Sandeep Acharya, Samar Basnet, and Aqore LLC, Arbitration, Hon. Jeffrey Keyes (Ret.)
- Microsoft Corporation v. WSOU Investments, LLC d/b/a Brazos Licensing and Development, IPR2021-00751, submitted IPR declaration
- SAP America, Inc. v. Express Mobile, Inc., IPR2021-01144, IPR2021-01145, IPR2021-01146, submitted IPR declarations
- StratosAudio Inc. v. Hyundai Motor America, 6:20-cv-01125-ADA, U.S. District Court for the Western District of Texas, Waco Division, submitted claim construction declaration and was deposed Peloton Interactive, Inc. v. Ifit Health and Fitness Inc, IPR2022-00029, IPR2022-00030, submitted IPR declarations and was deposed
- Investigation No. 337-TA-1263, In the matter of Certain televisions, remote controls, and components thereof, U.S. International Trade Commission, filed expert reports, was deposed, and testified at hearing
- Alexander Stross v. Netease, Inc., et al., U.S. District Court (Central District of California), Case 2:20-cv-00861-AB(JC), filed expert reports, and was deposed
- Ralph Ledergerber v. Netease, Inc., et al., U.S. District Court (Central District of California), Case 2:20-cv-00862-AB(JC), filed expert reports and was deposed
- John Walmsley v. Netease, Inc., et al., U.S. District Court (Central District of California), Case 2:20-cv-00863-AB(JC), filed expert reports and was deposed
- Bernhard Kuhmstedt v. Netease, Inc., et al., U.S. District Court (Central District of California), Case 2:20-cv-02044-AB(JC), filed expert reports and was deposed
- Netflix, Inc. v. CA, Inc., IPR2021-01319, submitted IPR declaration and was deposed
- F45 Training Pty Ltd. v. Body Fit Training USA Inc., C.A. No. 20-1194 (LPS) (D. Del.), filed expert report
- Apple v. Fintiv, IPR2022-00976, IPR2022-01149, IPR2022-01150, IPR2023-00399, submitted IPR declarations and was deposed
- Estech Systems, Inc. v. Howard Midstream Energy Partners d/b/a Howard Energy Partners, C.A. No. 6:20-cv-777-ADA (Western District of Texas, Waco Division), filed expert reports and was deposed
- Echelon Fitness Multimedia, LLC. v. Peloton Interactive, Inc., IPR2020-01187, submitted IPR declaration and was deposed
- VIZIO. V. Maxell Ltd., IPR2022-01458, submitted IPR declaration
- Maxell, Ltd. et el. v. VIZIO, Inc., Case No. 2-21-cv-06758 (C.D. Cal.). filed declaration and was deposed
- Microsoft Corporation v. SurfCast, Inc., submitted IPR declarations
- The Walt Disney Company et al. v. WAG Acquisition LLC, IPR2022-01227, IPR2022-01228, IPR2022-01346, submitted IPR declarations and was deposed
- Rakuten Rewards et al. v. IBM, submitted IPR declarations and was deposed
- Fubotv Media Inc. v. Sito Mobile R&D IP, LLC et al., submitted IPR declarations

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Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

- Unified Patents, LLC v. Noblewood IP LLC, IPR2022-01111, submitted IPR declaration
- Unified Patents, LLC. v. Pedersen, Peter Henrik, IPR2023-00029, submitted IPR declaration
- Ericsson Inc v. Dali Wireless Inc., submitted IPR declarations
- Universal Electronics, Inc. et al. v. Roku, Inc., IPR2022-00818, submitted declarations and was deposed
- Google LLC. v. Wildseed Mobile LLC et al., IPR2023-00244, IPR2023-00245, IPR2023-00246, IPR2023-00247, IPR2023-00248, submitted declarations
- Lululemon Athletica Canada Inc. et al. v. Nike, Inc., IPR2023-00180, IPR2023-00424, submitted declarations
- Zoho Corporation, et al. v. Meetrix IP, LLC, IPR2023-00371, IPR2023-00377, IPR2023-00379, IPR2023-00380, IPR2023-00382, submitted declarations
- WSOU Investments, LLC d/b/a/ Brazos Licensing and Development v. Google LLC, 6:20-cv-572, U.S. District Court for the Western District of Texas, Waco Division, submitted reports and was deposed
- Google LLC v. Safecast Limited LLC, IPR2023-00652, submitted declaration
- Investigation No. 337-TA-1338, In the matter of Certain smart televisions, U.S. International Trade Commission, filed reports and was deposed
- Cisco Systems, Inc. v. Orckit IP LLC, IPR2023-00714, submitted declaration
- SupplyPro, Inc. v. Sandvik Machining Solutions AB, et al., AAA Case No. 01-22-000-7897. submitted declaration
- TrackThings LLC v. NETGEAR, Inc., Case No. 22-00981-RGA-JLH, U.S. District Court for the District of Delaware, submitted declaration
- Walt Disney Parks & Resorts US Inc. v. Agile Journeys LLC; IPR2024-00029, submitted declaration
- Aylo Freesites Ltd v. Dish Technologies LLC; IPR2024-00043, IPR2024-00044, IPR2024-00045, IPR2024-00046, IPR2024-00047, IPR2024-00048, IPR2024-00146, IPR2024-00147; submitted declarations
- Arm Inc. et al. v. Icpillar LLC; IPR2024-00476, IPR2024-00566; Retained by Arm; submitted declarations
- Microsoft Corp et al. v. Litl LLC, IPR2024-00454, IPR2024-00455, IPR2024-00456, IPR2024-00457, IPR2024-00458; submitted declarations
- Cisco Systems Inc et al. v. InfoExpress Inc, IPR2024-00539, IPR2024-00540, IPR2024-00677, IPR2024-00678; submitted declarations
- Vizio Inc v. Multimedia Technologies Pte Ltd; IPR2024-00722, IPR2024-00723; Retained by Vizio; submitted declarations
- Sap America Inc v. Isix IP LLC; IPR2024-00615; Retained by SAP; submitted declarations
- Cisco Systems Inc et al. v. Portsmouth Network Corp; IPR2024-00505, IPR2024-00506; submitted declarations

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Publications

- “IP switching: server driven flow classification,” H. H. Houh, *Proceedings of the Washington University Workshop on Integration of IP and ATM*, November 1996.
- “Aurora at MIT,” D. D. Clark, H. H. Houh, and D. L. Tennenhouse, Editors, *MIT Laboratory for Computer Science Technical Report 673*, December 1995.
- “ViewStation Applications: Implications for Network Traffic,” C. J. Lindblad, D. Wetherall, W. Stasior, J. F. Adam, H. H. Houh, M. Ismert, D. Bacher, B. Phillips, and D. L. Tennenhouse, *IEEE Journal of Selected Areas in Communications*, 1995.
- “The VuNet Desk Area Network: Architecture, Implementation, and Experience,” H. H. Houh, J. F. Adam, M. Ismert, C. J. Lindblad, and D. L. Tennenhouse, *IEEE Journal of Selected Areas in Communications*, 13 (4), May, 1995.
- “Reducing the Complexity of ATM Host Interfaces,” H. H. Houh and D. L. Tennenhouse, *Hot Interconnects II Symposium Proceedings*, Stanford, August 11-12, 1994.
- “Media-intensive data communications in a ‘desk-area’ network,” J. F. Adam, H. H. Houh, M. Ismert, and D. L. Tennenhouse, *IEEE Communications*, August 1994.
- “ViewStation Applications: Intelligent Video Processing Over A Broadband Local Area Network,” C. J. Lindblad, D. J. Wetherall, W. Stasior, B. Phillips, D. Bacher, J. Adam, H. Houh, M. Ismert, and D. L. Tennenhouse, *Proceedings of the 1994 USENIX Symposium on High-Speed Networking*, Oakland, CA, August 1994.
- “The Media Gateway: Live Video on the World Wide Web,” H. H. Houh, C. J. Lindblad, J. Soo, D. L. Tennenhouse, and D. J. Wetherall, *Workshop at the 1994 World Wide Web Conference*, Geneva, Switzerland, May 1994.
- “Active Pages: Intelligent Nodes on the World Wide Web,” H. H. Houh, C. J. Lindblad, and D. J. Wetherall, *Proceedings of the 1994 World Wide Web Conference*, Geneva, Switzerland, May 1994.
- “Wavelength Division vs. Code Division Access Methods for Optical Networks,” H. H. Houh, *Area Exam Paper*, May 1993.
- “Experience with the VuNet: A Network Architecture for a Distributed Multimedia System,” J. F. Adam, H. H. Houh, D. L. Tennenhouse, *Proceedings of the 18th Conference on Local Computer Networks*, pp. 70-76, September 1993
- “The VudBoard: A Simple DMA Interface,” H. H. Houh, *Proceedings of the 4th Gigabit Minijam*, January 1994.
- “A Software-Oriented Approach to the Design of Media Processing Environments,” D. L. Tennenhouse, J. Adam, D. Carver, H. Houh, M. Ismert, C. Lindblad, W. Stasior, D. Weatherall, D. Bacher, and T. Chang., *submitted to the International Conference on Multimedia Computing and Systems*, May 1994.
- “A Network Architecture for Distributed Multimedia Systems,” J. F. Adam, H. H. Houh, M. Ismert, and D. L. Tennenhouse, *submitted to the International Conference on Multimedia Computing and Systems*, May 1994.

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- “The Viewstation Collected Papers,” D. L. Tennenhouse, J. Adam, C. Compton, A. Duda, D. Gifford, H. Houh, M. Ismert, C. Lindblad, W. Stasior, R. Weiss, D. Wetherall, D. Bacher, D. Carver, and T. Chang, MIT Laboratory for Computer Science Technical Report, MIT/LCS/TR-590, November 1993.
- “The Viewstation Collected Papers II,” W. F. Stasior, D. L. Tennenhouse, J. F. Adam, D. R. Bacher, H. H. Houh, M. Ismert, C. J. Lindblad, B. M. Phillips, D. J. Wetherall, MIT Laboratory for Computer Science Technical Report, MIT/LCS/TR-696, April 1996.
- “A System's Perspective of the Sagnac Fiber Logic Gates and Their Possible Applications,” A. Huang, N. Whitaker, C. Gabriel, H. Avramopoulos, P. M. W. French, H. H. Houh, and I. Chuang, Applied Optics, September 10, 1994
- “Complete Switching in a Three-Terminal Sagnac Switch,” H. Avramopoulos, P. M. W. French, M. C. Gabriel, H. H. Houh, N. A. Whitaker, T. Morse, IEEE Phot. Tech. Lett. **3** (3), 235
- “Complete Switching in a Three-Terminal Sagnac Switch,” H. Avramopoulos, P. M. W. French, M. C. Gabriel, H. H. Houh, N. A. Whitaker, IEEE/LEOS Annual Meeting, Paper PDP-13, November 1990
- “All-optical phase-locked oscillator,” N. A. Whitaker, Jr., H. H. Houh, H. Avramopoulos, T. F. Morse, IEEE/LEOS Annual Meeting, Paper ELT2.4/MOO3, November 1990
- “Passive modelocking of an all-fiber erbium laser,” H. Avramopoulos, H. H. Houh, N. A. Whitaker, M. C. Gabriel, T. F. Morse, IEEE/LEOS Conference on Optical Amplifiers and their Applications, Paper PDP-8, August 1990
- “Transverse modes, waveguide dispersion, and 30ps recovery in submicron GaAs/AlAs microresonators,” J. L. Jewell, S. L. McCall, A. Scherer, H. H. Houh, N. A. Whitaker, A. C. Gossard, and J. H. English, Appl. Phys. Lett. **55** (1), July 3, 1989

Leadership, Activities and Interests

- Leadership
 - Reading Symphony Orchestra
 - Board of Directors (Treasurer), 2022 - present
 - Discovery Museums (Acton, MA)
 - Board of Directors, 2023 – present
 - Board of Directors, Development Committee, 2023 – present
 - Science and Technology Advisory Council, 2012 - present
 - Tau Beta Pi National Engineering Honor Society
 - Executive Councilor, 2024-2026
 - Advisor, MA B Chapter at MIT, 2003 - present

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- District Director (National Officer), Tau Beta Pi, New England Area, 1991 - 2003
- President, MA B Chapter at MIT, Fall 1988 - Spring 1989
- Laureate award, 1989
- MIT Alumni Association Board of Directors
 - MIT Annual Giving Board, 3 year term, 2024 – 2027
 - National Selection Committee, 3 year term, 2020 – 2023
 - K-12 STEM Initiatives Co-chair, 2013 – 2017
 - Awards Committee Chair, 2012 – 2014
 - Awards Committee, 3 year term, 2011 – 2014
 - Vice President, 2 year term, 2004 – 2006
 - Alumni Ad-Hoc Committee, Chair, 2005-2006
 - Board Member, 2 year term, 1997 – 1999
- MIT Club of Boston
 - Board of Directors, 2006 - 2011
 - K-12 Initiatives Chair, 2009 - 2012
 - VP of Communications, MIT Club of Boston, 2003 - 2006
 - Past-President, MIT Club of Boston, 2002 - 2003
 - President, MIT Club of Boston, 2001 - 2002
 - President-Elect, MIT Club of Boston, 2000 - 2001
 - VP of Programs, MIT Club of Boston, 1999 - 2000
 - Activities Super-Chair, MIT Club of Boston, 1998 - 1999
- MIT Enterprise Forum of Cambridge, Inc.
 - Past Chair, 2009 – 2011
 - In-NOW-vation Co-chair, 2010
 - Chair, 2007 - 2009
 - Vice Chair, 2005 - 2007
 - Executive Board Member, 2002 - 2011
 - Winter Workshop Co-Chair, February 2007 - conceived idea for conference, which sold-out and produced largest attendance numbers in recent memory
 - Spring Workshop Co-Chair, Spring 2004
 - Membership Committee Chair, Fall 2003 - 2006
 - 25th Anniversary Dinner Chair, Fall 2003
 - As Membership Chair and Board Member, started Special Interest Groups in 2004; a SIG won the MIT Presidential Citation award, the MIT Alumni Association's highest award for organizations, in 2006
- Estabrook Elementary School PTA
 - Advisory committee to the superintendent on PCB issue, 2010-2011
 - 4th Grade after-school science program co-organizer, 2010-2012
 - 4th and 5th Grade before-school Math Olympiad co-organizer, 2009-2013
 - 5th Grade BBQ and Yearbook Committee, 2011, 2013

Declaration of Henry Houh, Ph.D. Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent Nos. 8,924,543

- Family Math Night volunteer, 2008-2012
- MIT Class of 1989
 - Secretary, five consecutive 5 year terms, 1989 - 2014
 - 30-year Reunion Committee, 2019
 - 25-year Reunion Committee, 2014
 - 20-year Reunion Committee and Gift Committee, 2009
 - 15-year Reunion Committee and Gift Committee, 2004
 - 10-year Reunion Committee and Gift Committee, 1999
 - 5-year Reunion Committee, 1994
 - Interim Treasurer, 1993 - 1994
 - Instituted annual senior class career fair, now raising over \$100,000 annually for senior class activities, Fall 1988
- Strong, consistent record of leadership dating to high school
- Acting
 - ‘21’ (Sony Pictures), credited as “Chinatown Dealer,” 2007, Kevin Spacey's movie about the MIT Blackjack Team inspired by “Bringing Down the House” by Ben Mezrich, opened nationwide on March 28, 2008. 21 was the number one movie in US for two weeks and number one globally for one week. 21 also topped the DVD sales, Blu-ray sales and DVD rental charts.
 - Spring Lake Theater Company, first New York-area off-broadway production of “A Chorus Line,” played role of Mark, Summer 1990
- Former member of the MIT Blackjack team
- Producer for 10,000 Maniacs’ 2013 album “Music from the Motion Picture”
- Executive Producer for 10,000 Maniacs’ 2015 album “Twice Told Tales”
- Violist, violist, harpist, guitarist, singer, actor: played in many amateur/semi-professional groups including Firebird Pops Orchestra, Reading Symphony Orchestra, MIT Summer Philharmonic Orchestra, Carlisle Chamber Orchestra, Rivers Symphony Orchestra, Opera51 Orchestra, Freisinger Chamber Orchestra, Merrimack Valley Philharmonic, Longwood Symphony, MIT Symphony, and Somerville Community Chorus
- Violist, “Coming Home” album by Karen Phillips, 2014
- Google Scholar citations: 2079, h-index: 21, i10-index: 26 (since 2017: 662/12/14)
- Erdos-Bacon number of 7
- Erdos-Bacon-Sabbath number of 11