UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RPX CORP., ERICSSON INC., AND TELEFONAKTIEBOLAGET
LM ERICSSON,
Petitioner

v.

IRIDESCENT NETWORKS, INC. ("Iridescent"),
Patent Owner

Patent 8,036,119

Title: SYSTEM AND METHOD OF PROVIDING BANDWIDTH ON DEMAND

DECLARATION OF NARASIMHA REDDY, PH.D. UNDER 37 C.F.R. § 1.68

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I. Introduction

I, Narasimha Reddy, do hereby declare:

1. I am making this declaration at the request of RPX Corporation ("RPX"), Ericsson Inc. and Telefonaktiebolaget LM Ericsson ("Ericsson") (collectively, "Petitioners") in the matter of the *Inter Partes* Review of U.S. Patent No. 8,036,119 ("the '119 Patent") to Kathy McEwen.

2. In the preparation of this declaration, I have studied:

(1) The '119 Patent, ERIC-1001;

(2) The prosecution history of the '119 Patent, ERIC-1002;

(3) U.S. Patent No. 7,639,612 ("the '612 Patent"), of which the '119 Patent is a continuation, ERIC-1003;

(4) The prosecution history of the '612 Patent, ERIC-1004;

(5) U.S. Patent No. 6,563,793 ("Golden"), ERIC-1007;

(6) U.S. Pat. Pub. No. 2001/0023443 ("Fichou"), ERIC-1008;

(7) U.S. Pat. Pub. No. 2006/0133300 ("Lee"), ERIC-1009;

(8) U.S. Pat. Pub. No. 2003/0219006 ("Har"), ERIC-1010;

(9) U.S. Pat. Pub. No. 2003/0133552 ("Pillai"), ERIC-1011;

(10) U.S. Pat. No. 7,164,435 ("Wang"), ERIC-1012;

(11) The prosecution history of U.S. Application No. 09/060,520, incorporated by reference into Golden ("the '520 application"), ERIC-1013; and

(12) U.S. Pat. Pub. No. 2005/0024487 (“Chen II”), ERIC-1029.

3. In forming the opinions expressed below, I have considered:

(1) The documents listed above, and

(2) My knowledge and experience based upon my work in this area as described below.

II. Level of Ordinary Skill in the Art

4. I am familiar with the technology at issue. I am also aware of the state of the art at the time the application resulting in the ’119 Patent was filed. The earliest priority date is May 2, 2006. Based on the technologies disclosed in the ’119 Patent, I believe that one of ordinary skill in the art would include someone who has a B.S. degree in Electrical Engineering, Computer Engineering, Computer Science, or equivalent training, as well as two to three years of technical experience in the field of packet-switched networking, such as Internet, local area, and wide area networks. Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of one of ordinary skill in these technologies at and around the priority date of the ’119 Patent.

III. Qualifications and Professional Experience

5. I am currently the J.W. Runyon Professor of Electrical and Computer Engineering at Texas A&M University in College Station, Texas. I have over 25 years of experience in a wide variety of technologies and industries relating to data communications, storage systems, distributed systems, including the development of mechanisms and protocols for detecting and avoiding network congestion.

6. My academic credentials include a Bachelor's of Technology Degree in Electronics and Electrical Communications Engineering from the Indian Institute of Technology, in Kharagpur, India, in August 1985. I then received a Masters of Science and a Ph.D. degree in Computer Engineering from the University of Illinois at Urbana-Champaign in May 1987 and August 1990, respectively.

7. My professional background and technical qualifications are stated above and are also reflected in my *Curriculum Vitae*, which is attached as ERIC-1006. I am being compensated at a rate of $550.00 per hour, with reimbursement for actual expenses, for my work related to this Petition for *Inter Partes* Review. My compensation is not dependent on, and in no way affects, the substance of my statements in this Declaration.

8. I have worked for over 25 years in the field of Electrical Engineering. My primary focus and research interest has been on Computer Networks, Storage Systems, Multimedia systems, and Computer Architecture. I have authored and co-authored over a hundred technical papers and several book chapters related to several of these interests, including on such topics as multipath routing, route control, high-speed networks, congestion, packet management, quality of service regulation, network security, network modeling, differentiated services, storage system enhancements, and multimedia system enhancements to name a few examples. I am listed as an inventor on five patents in the field of multi-node communication networks.

9. My employment history following my graduation from the University of Illinois at Urbana-Champaign began at the IBM Almaden Research Center in San Jose, California in 1990. At IBM, I worked on projects related to disk arrays, multiprocessor communication, hierarchical storage systems and video servers.

10. In 1995, I joined the faculty of the department of Electrical Engineering at Texas A&M University initially as an Associate Professor and was later promoted to a full, tenured professor. At Texas A&M, I am Associate Agency Director for Strategic Initiatives and Centers for the Texas A&M Engineering Experiment Station (TEES), which engages in engineering and technology-oriented research and educational collaborations. Further, I currently serve as Associate Dean for Research.

11. At Texas A&M, I have taught dozens of courses related to computer networking and communications, as well as computer architecture, multimedia systems and networks, topics in networking security, multimedia storage and delivery, as well as networking for multimedia applications. I have also served on various committees for the benefit of the scientific community and the Texas A&M University community.

12. I am a member of a number of professional societies, including the Institute of Electrical and Electronic Engineers (IEEE), where I have been elevated to an IEEE Fellow, and the Association for Computing Machinery (ACM). I have been responsible for chairing or co-chairing numerous conferences and programs, as well as presenting research at major IEEE and ACM conferences. For example, I served as program co-chair for the 2008 5th International Conference on Broadband Communications, Networks and Systems, panels co-chair for the 2008 3rd International Conference on Communication Systems Software & Middleware, and panel chair of the IEEE Conference of High Performance Computer Architecture.

13. My recent presentations include a Keynote speech at International Conference on Information Technology-New Generations in 2013, a Keynote speech at IEEE International Symposium on Computers and Communications 2010, several invited talks including Georgia Tech (2013), COMSNETS Conference (2013), International Conference on Networking and Communications (2012), Samsung (2011), Korea University (2011), Aijou University (2011), Catedra Series talk at University of Carlos III, Madrid (2009), Thomson Research, Paris (2009), Telefonica Research, Barcelona (2009) and a Distinguished Seminar at IBM Austin Research Lab (2008).

14. I have received multiple awards in the field of networks and computer architecture. I received the NSF Career Award from 1996-2000. I received an outstanding professor award by the IEEE student branch at Texas A&M during 1997-1998, an outstanding faculty award by the department of Electrical and Computer Engineering during 2003-2004, a Distinguished Achievement award for teaching from the former students association of Texas A&M University, and a citation "for one of the most influential papers from the 1st ACM Multimedia conference."

15. A copy of my curriculum vitae is attached as ERIC-1006. Additional information regarding my education, technical experience and publications, including a list of the US patents of which I am an inventor/co-inventor, is included therein.

IV. Relevant Legal Standards

16. I have been asked to provide my opinions regarding whether the claims of the '119 Patent would have been obvious to a person having ordinary skill in the art at the time of the alleged invention of the patent, in light of the prior art.

Obviousness

17. It is my understanding 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 also understand 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.

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

V. The ’119 Patent

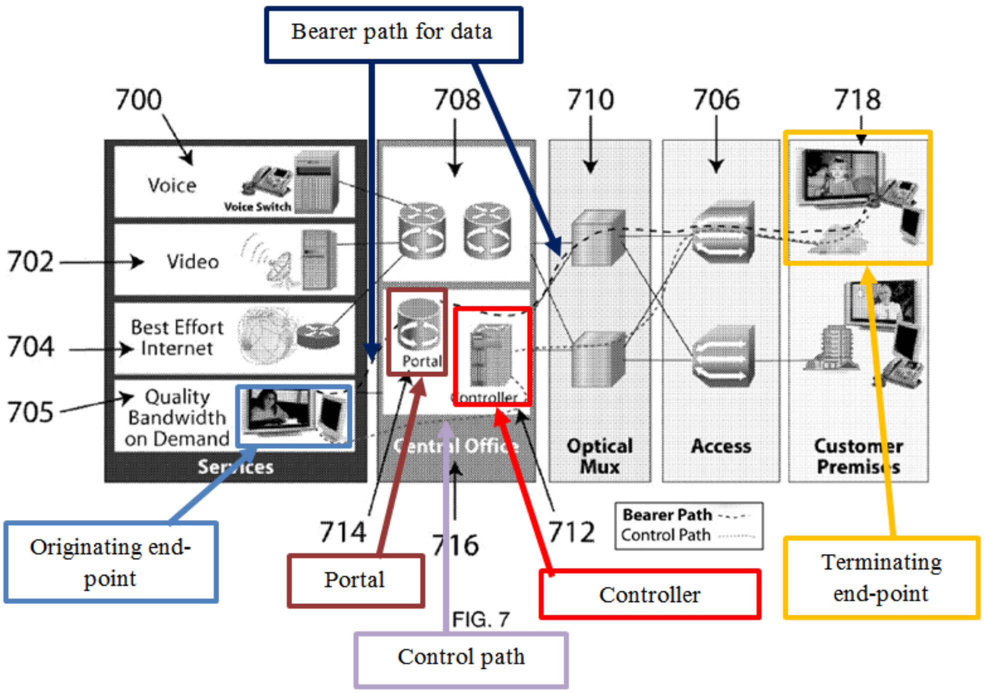
A. Overview

19. The findings below are based on my understandings of the art related to the ’119 Patent, as well as what I think one of ordinary skill in the art would have understood, at the time period at and prior to May 2, 2006.

20. The ’119 Patent relates to communications systems, such as systems that provide guaranteed bandwidth on demand for end users and/or enterprises. ERIC-1001, 1:19-22. According to ’119 Patent, “Internet protocol (IP) networks were designed to handle any traffic, on any port, at any time.” ERIC-1001, 1:23-24. “[E]ach of the computing platforms, or routers, were originally designed to be ad-hoc in nature … [a]s a result of IP’s original design goals, the path that a packet takes from origin to destination is completely unpredictable.” ERIC-1001, 1:30-37.

21. The ’119 Patent states that it “provides an improved unique system and method of providing bandwidth on demand for an end user and/or enterprise.” ERIC-1001, 4:46-48. “The invention involves taking a distributed approach to handling bearer packets, with a physically separated controller and managed portal platform.” ERIC-1001, 4:64-66. “The Controller handles signaling, routing, dynamic bandwidth admission control, codec (video and/or voice) negotiation, end-to-end quality assurance, session management, subscriber data, billing, provisioning and associated operational functions.” ERIC-1001, 4:66-5:3. “The Portal handles the packet bearer transport with the admission control and routing instructions given by the separate physical Controller." ERIC-1001, 5:3-6.

22. FIG. 7 illustrates the proposed "Controller and Portal solution in the Access Network," with the "controller" in red, the portal in brown, the originating end-point in blue, and the terminating end-point in orange:



ERIC-1001, FIG. 7 (annotated); 4:29-30.

23. "The Controller 712 accepts requests from an originating end-point to access the network with a high quality connection dynamically" and then "negotiates across the network with the terminating end-point(s) to set up the connection." ERIC-1001, 5:27-31. The Controller 712 is used with "one class of service type … to cover all high quality services." ERIC-1001, 5:35-38. Traffic requesting the service type is routed to the Controller 712 and Portal 714 for handling, or "if the broadband access provider does not want to provision a specific class of service for the Controller and Portal for handling, a consumer may signal directly to the Controller and Portal." ERIC-1001, 5:39-45.

24. FIG. 8 illustrates a situation "when one dynamic video or bandwidth user wants to connect to another," in which "they simply dial a directory number or IP address or web page to request a connection on demand." ERIC-1001, 5:46-49. "The Controller 800 will receive the request, including bandwidth required and if video, a video codec type and a service type tag (if applicable) for billing purposes." ERIC-1001, 5:49-52. The Controller 800 will "determine from its embedded subscriber database whether the user is authorized to use the bandwidth, video type and service or not, how to bill them, and whether the destination party can be reached." ERIC-1001, 5:52-55.

25. The '119 Patent continues that "the Controller 800 inter-works with network protocols to dynamically provision a dedicated path, including required route and bandwidth, on demand through the network." ERIC-1001, 5:64-67. There is a Portal platform 802 associated with the Controller 800, as well as "any destination party's Controller" that is signaled to also reserve far-end resources. ERIC-1001, 5:67-6:3. Through the Controller 800, the end-users are enabled to negotiate with the network including "information elements necessary to ensure an end-to-end video connection free from video codec conversion in the core if possible." ERIC-1001, 6:4-8.

26. With reference to FIG. 9, "the Controller 900 and Portals 1102 [sic] can be physically located in the same location or in separate locations." ERIC-1001, 6:11-13. In particular, the '119 Patent states that it "takes distributed switching control concepts from the low-bandwidth voice domain, and extends them to the variable-bandwidth packet routing domain." ERIC-1001, 6:20-23. Specifically, "the Portal 902 is under the direct management of the Controller 900" such that it "only accepts traffic on its ports when authorized by the Controller 900 … and notifies the Controller 900 if a user's traffic terminates or exceeds allowance." ERIC-1001, 6:23-27.

27. The '119 Patent states with respect to the "Portal" that it "does not perform new routing on any packet, and only acts on the information provided by the controller 900." ERIC-1001, 6:27-29. In particular, the '119 Patent continues that "any packets [that] are received on any port at the Portal 902," if they are not from an authorized user, "are discarded without prejudice." ERIC-1001, 6:29-32. With authorized users, the Controller 900 "determines whether the user who is exceeding their limit [notified by alarm from the Portal 902] should be disconnected, or allowed to continue." ERIC-1001, 6:33-38.

28. FIG. 10 continues with another example of an end-to-end network solution. The '119 Patent states that "[t]he Controller 1000 and Portal 1002 interconnect to each other and any other platforms, which could be via existing IP/MPLS routers or multiplexing equipment or other transport connection mechanisms." ERIC-1001, 6:50-53.

29. FIG. 11 again shows a "Controller 1100 and Portal 1102 [that] interconnect to each other and any other platforms 1106, which could be via existing IP/MPLS routers 1108 and/or multiplexing equipment and/or any other transport mechanisms." ERIC-1001, 7:6-11. Notably, "the consumers 1110, businesses 1112, and or content providers 1114 are connected, for control signaling via path 1116 and via path 1118 for bearer path, directly to the Controller 1100 and Portal 1102 across the access domain." ERIC-1001, 7:11-15. FIG. 11 shows these paths:

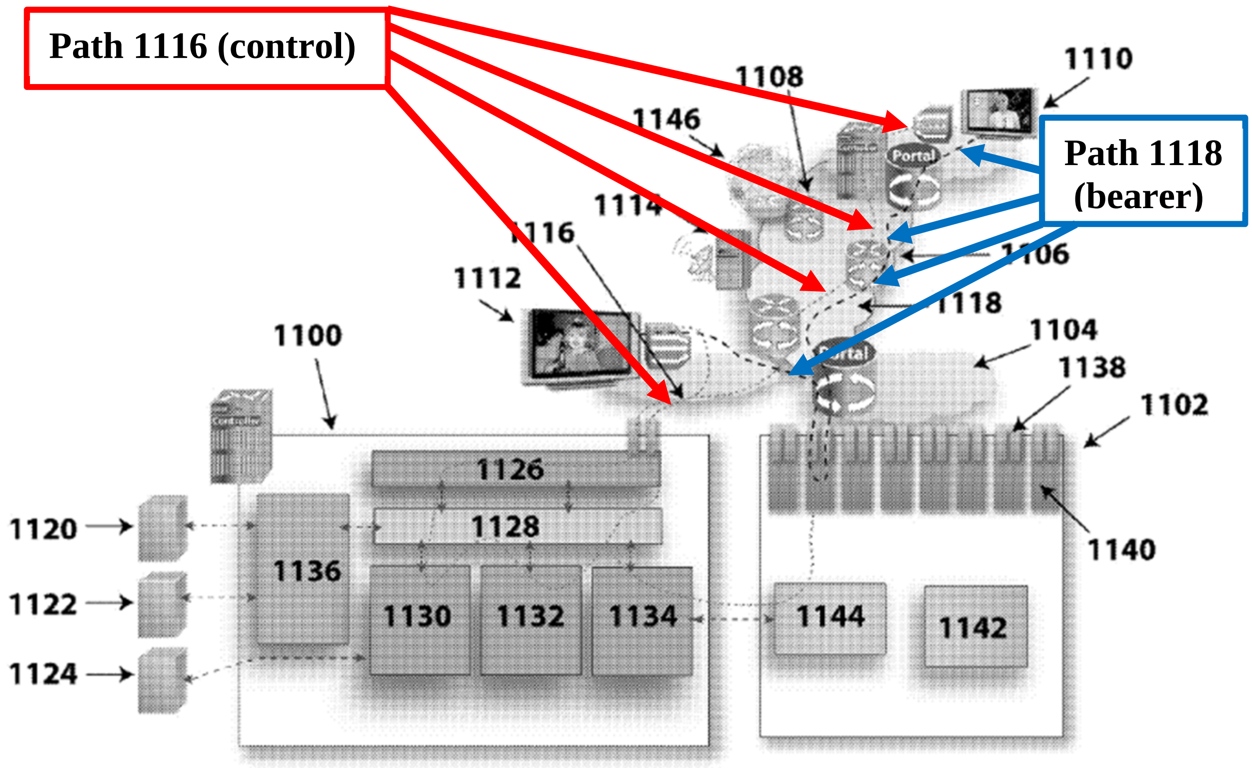


FIG. 11

ERIC-1001, FIG. 11 (annotated).

30. Thus, FIG. 11's control signaling path 1116, even though described as being connected between the end-points (consumers 1110, businesses 1112, and content providers 1114), FIG. 11 illustrates that these connections still may occur through one or more intermediary devices, such as the control path from the Controller 1100 to the consumer 1110 via existing routers 1108 and another controller.

31. With respect to the Portal 1102 specifically, the '119 Patent states that it "includes I/O ports 1138 on line cards 1140 for the bearer connections, a switching matrix 1142 and a portal connectivity processing element 1144." ERIC-1001, 7:24-26.

32. With respect to billing arrangements, the '119 Patent states that "the Controller supports flexible charging arrangements" whether based on service type, time elapsed, codec type, bandwidth used, and whether billed after termination of a session or on a pre-paid mechanism. ERIC-1001, 6:61-7:1.

33. Independent claim 1 is exemplary and recites:

> 1. A method for providing bandwidth on demand comprising:
>
> receiving, by a controller positioned in a network, a request for a high quality of service connection supporting any one of a plurality of one-way and two-way traffic types between an originating end-point and a terminating end-point, wherein the request comes from the originating end-point and includes at least one of a requested amount of bandwidth and a codec;
>
> determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the codec and whether the terminating end-point can be reached by the controller;
>
> directing, by the controller, a portal that is positioned in the network and physically separate from the controller to allocate local port resources of the portal for the connection;
>
> negotiating, by the controller, to reserve far-end resources for the terminating end-point; and

providing, by the controller to the portal, routing instructions for traffic corresponding to the connection so that the traffic is directed by the portal based only on the routing instructions provided by the controller, wherein the portal does not perform any independent routing on the traffic, and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller, and wherein control paths for the connection are supported only between each of the originating and terminating end-points and the controller and between the portal and the controller.

34. The features of claim 1, as well as the other claims at issue, were well-known in the art prior to the priority date of the '119 Patent. For instance, others had already taught the usefulness and desirability of requesting bandwidth on demand from end-to-end, including requests for a high quality of service connection, dynamic provision of the requested connection by a separate control element, determination of a unique path for the requested connection, provision of that path at a portal so that the portal does not perform independent routing on traffic of the requested connection, and using separate control paths for the controller, endpoints, and provisioned portal. (*See* ERIC-1007, ERIC-1008, and ERIC-1009).

35. Accordingly, I show in the claim charts below that the elements and functionality recited in claims 1-16 of the ’119 Patent were already well known before the earliest claimed priority date of the ’119 Patent.

B. History of the ’119 Patent

36. The ’119 Patent issued on October 11, 2011 from U.S. Patent Application No. 12/632,786 by Kathy McEwen. I have been informed by counsel that the earliest alleged priority date for the ’119 Patent is May 2, 2006.

37. In an Office Action dated February 2, 2011, the Examiner rejected claims 2 and 3 under a statutory type double patenting rejection. ERIC-1002, p. 40. Further, the Examiner rejected claims 1 and 4-14 and allowed claims 20-23. *Id.* at pp. 40-42, 45. Finally, the Examiner rejected claims 15-19 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,961,539 to Schweinhart. *Id.* at p. 42. In response, Applicant cancelled claims 2-3 and 15-19 and filed a terminal disclaimer over the parent patent, U.S. Patent No. 7,639,612. *Id.* at pp. 25-32.

38. In response thereto, the Patent Office issued a Notice of Allowance on June 14, 2011 for pending claims 1, 4-14, and 20-23 and subsequently the ’119 Patent as claims 1-16. *Id*. at pp. 14-18.

C. History of the ’612 Patent

39. I also reviewed the prosecution history of the ’612 Patent. The ’612 Patent issued on December 29, 2009 from U.S. Application No. 11/743,470 by Kathy McEwen.

40. In a Non-Final Office Action dated August 5, 2008, the Examiner rejected several claims under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. ERIC-1004, pp. 131-132. In particular, the Examiner stated that "[t]he specification does not adequately describe how high quality and low latency are determined." ERIC-1004, p. 132. The Examiner also rejected the claims under various obviousness grounds. ERIC-1004, pp. 132-151.

41. In a response dated November 4, 2008, the Applicant argued that the claims had been amended to overcome the 35 U.S.C. § 112, first paragraph rejection, and argued that there was no suggestion or motivation to combine the references as provided in the Non-Final Office Action. *See* ERIC-1004, pp. 107-122.

42. The Examiner was not persuaded by the Applicant's arguments. In a Final Office Action mailed January 22, 2009, the Examiner maintained the same 35 U.S.C. § 112, first paragraph (enablement) rejection and raised new 35 U.S.C. § 112, second paragraph and 35 U.S.C. § 103(a) rejections. *See* ERIC-1004, pp. 71-99.

43. In response, the Applicant cancelled all of the pending claims and added new claims that formed the basis of what would eventually be issued in the '612 Patent. ERIC-1004, pp. 43-48. In arguing against the 35 U.S.C. § 112, first paragraph (enablement) rejection, the Applicant focused on the newly-added language "high quality of service connection" with the assertion that it was supported by the specification. ERIC-1004, pp. 44-51. "More specifically, Applicant references Fig. 3 of the disclosure, which is reproduced below for convenience." ERIC-1004, p. 50. That figure, as provided in the Applicant's response, is likewise reproduced here (from the '119 Patent, ERIC-1001, instead of the response on p. 50 of ERIC-1004 for better viewability):

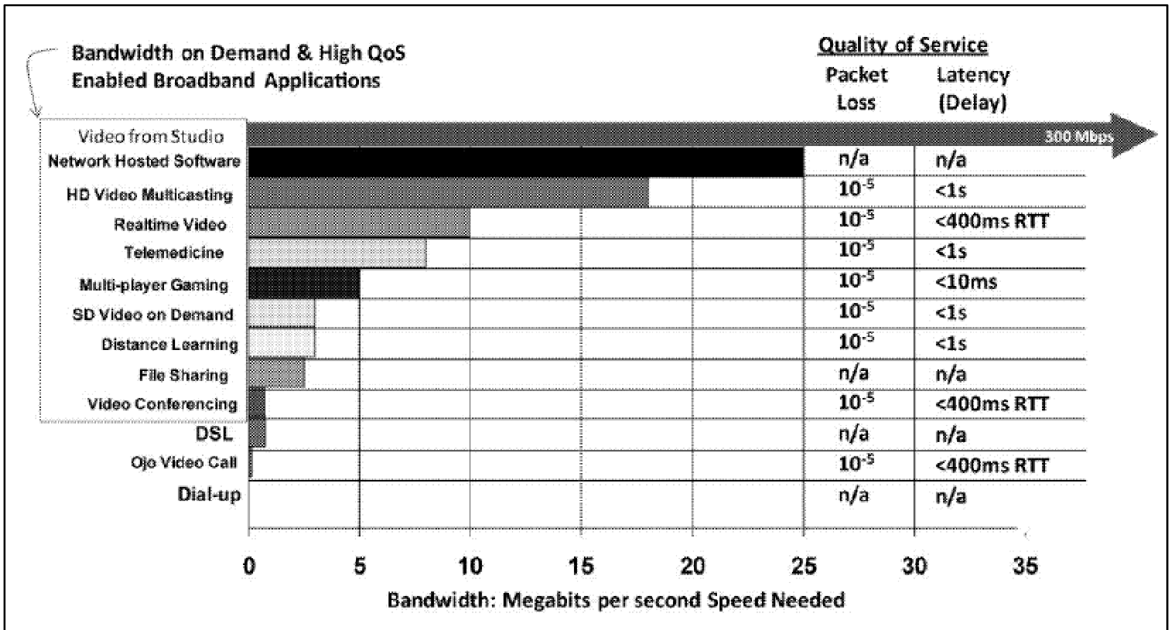


FIG. 3

ERIC-1001, FIG. 3 (*see also* ERIC-1004, p. 50).

44. Applicant argued in particular:

> As illustrated by the boxed set of applications on the left side of Fig. 3, high QoS (quality of service) may be viewed in the present application as having speeds varying from approximately 1-300 megabits per second, packet loss requirements that are typically about

> 10^{-5}, and latency requirements that are typically less than one second. These are commonly used parameters and, as illustrated in Fig. 3, often vary somewhat based on the type of application. For example, video conferencing may be possible with the listed parameters, while HD video multicasting typically has more stringent requirements in order to be acceptable.

ERIC-1004, p. 51.

45. The Applicant then quoted from the specification:

> The services that may be delivered on broadband are many, ranging from real-time critical applications for communication purposes: video calling, multi-player gaming, telemedicine, television studio broadcast interviews, and high-definition news multicasting to name a few. These examples and a few others are listed in FIG. 3. These real time critical applications are very sensitive to any delay and for· any that may include video or gaming frames, very sensitive to any variance in the delay. Applications which include video are also sensitive to any packets (or frames) which may be lost in the transmission (0.0001 % packet loss is the preferred quality for video transmission).

ERIC-1004, p. 51 (from ERIC-1003, 1:59-2:3).

46. In addition, the Applicant argued that "much of the cited art is clearly directed to access networks and other connections that are not end-to-end." ERIC-1004, p. 52. "However, Applicant's claimed invention is directed to end-to-end connection management (i.e., between an originating end-point and a terminating end-point) with a controller that provides 'end-to-end quality assurance.'" *Id.*

47. The Applicant further argued that "an 'end-point' as used in the specification refers to both an originating point and a terminating point relative to the entire connection … In other words, the terms 'originating end-point' and 'terminating end-point' as used in the claims do not refer to intermediate points in a connection (e.g., network nodes or elements supporting the connection such as the controller and portal) but rather the two sides engaged in the connection." *Id.*

48. In response to the amendments and arguments filed, the Examiner proposed an Examiner's amendment in a call to Applicant's attorney, which was authorized and reflected in the Notice of Allowance that mailed October 19, 2009. ERIC-1004, pp. 23-27. The independent claim had added to it the limitations regarding receiving notification that traffic has exceeded an authorized limit and determining whether to terminate the connection. *See* ERIC-1004, pp. 25-26.

49. As shown herein, however, the Examiner during prosecution of the '612 Patent, and thus by extension the '119 Patent, failed to appreciate all of the relevant art that would have been known to a person having ordinary skill in the art as of the earliest alleged priority date of the '119 Patent. For example, Golden teaches method and apparatus for reserving a requested quality of service connection by an enterprise control point all along the requested path from beginning to end (which Golden shows to be the originating and terminating endstations of the path). *See, e.g.*, ERIC-1007, Abstract.

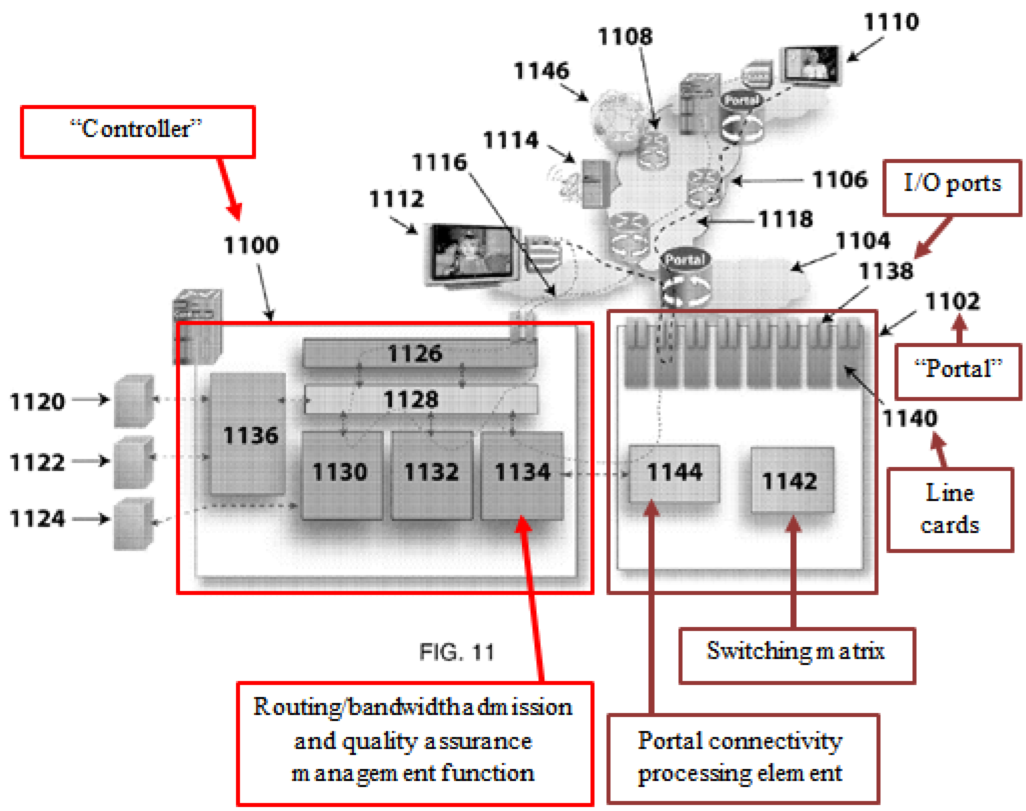
VI. Claim Construction of Certain Terms in the ’119 Patent

50. It is my understanding that in order to properly evaluate the ’119 Patent, the terms of the claims must be defined. It is my understanding that for the purposes of *inter partes* review, the claims are normally to be given their broadest reasonable interpretation in light of the specification. It is my further understanding that claim terms are given their ordinary and accustomed meaning as would be understood by one of ordinary skill in the art, unless the inventor, as a lexicographer, has set forth a special meaning for a term. As such, any claim term not construed below should be given its ordinary and customary meaning. In order to construe the following claim terms, I have reviewed the entirety of the ’119 Patent, as well as its prosecution history.

A. “directing, by the controller, … [a portal] … to allocate local port resources of the portal”

51. This claim term is found and used similarly in claims 1 and 13.

52. Resources of the portal are illustrated in FIG. 11, reproduced and annotated below, and described as“[t]he Portal 1102 includes I/O ports 1138 on line cards 1140 for the bearer connections, a switching matrix 1142 and a portal connectivity processing element 1144.” ERIC-1001, 7:24-26.



ERIC-1001, FIG. 11 (annotated).

53. As shown, the Controller 1100 sends instructions from the "routing/admission and quality assurance management function 1134" element to the "portal connectivity processing element 1144" in the portal "necessary for the broadband services to be dynamically connected and managed with quality." ERIC-1001, 7:15-23. In operation, the '119 Patent in other embodiments discloses that "[t]he Controller 800 directs its associated Portal platform 802 to allocate local port resources" (the only usage of that term in the body of the specification) and the portal "only accepts traffic on its ports when authorized by the Controller." *Id.* at 5:67-6:1, 6:25-26.

54. Thus, the ‘119 Patent discloses that in response to allocation instructions from the controller, the elements included within the portal affect the routing, admission and quality of the connection determined by the controller. Moreover, as understood by a person having ordinary skill in the art, the portal elements can be implemented as physical and/or logical elements.

55. Therefore, in view of the above, under a BRI a person having ordinary skill in the art would have construed the claim term “directing, by the controller, … [a portal] … to allocate local port resources of the portal” to include at least *sending an allocation instruction from the controller to the portal, where the allocation instruction results in the portal allocating physical and/or logical elements of the portal*.

VII. Grounds of Invalidity

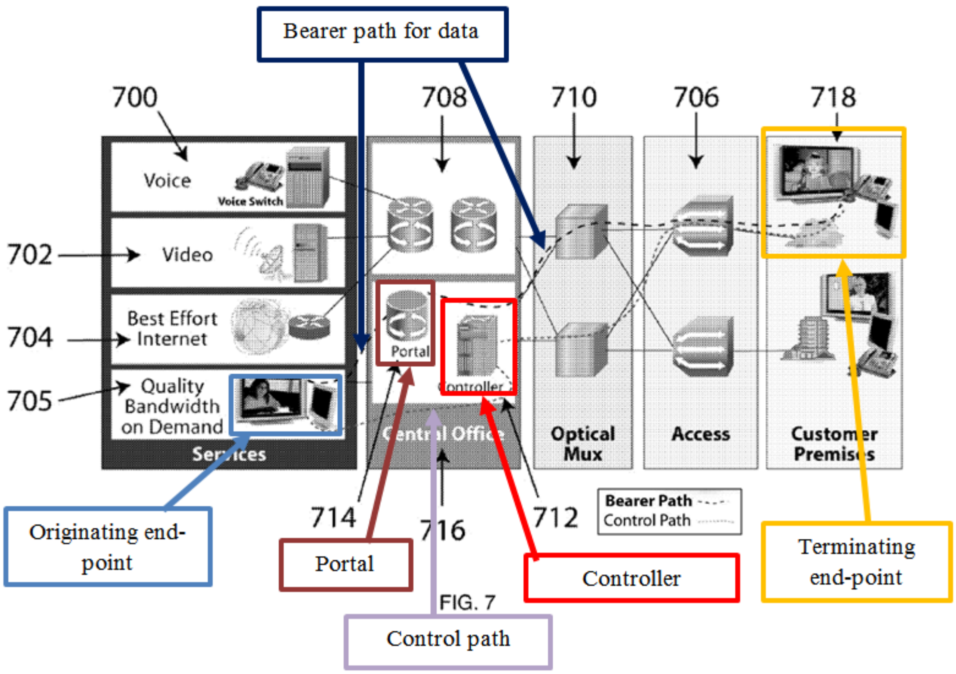
56. The ’119 Patent,” (ERIC-1001) is directed to a method for providing bandwidth on demand for a desired quality of service (QoS) between an “originating” end-point and a “terminating” end-point. The ‘119 Patent’s purported novelty is to separate control functions and packet transmission functions into two physically separate entities: (1) a “controller” that provides end-to-end quality assurance, and (2) a “portal” that handles packet transmission based on routing instructions from the controller. ERIC-1001, 1:19-22, 4:64-5:6

57. The architecture of the ’119 patent purportedly recognizes limitations of different prior art approaches for providing connectivity. According to the ’119 Patent, prior art routers in Internet networks were designed to be ad-hoc in nature, resulting in “completely unpredictable” paths from origin to destination for packets, ERIC-1001, 1:30-43, to the detriment of “real-time critical” applications. *Id.*, 1:61-2:5.

58. In contrast, the ’119 Patent states that dedicated lines offered greater control over quality assurance, but at the cost of failing to economically scale with the number of users as each service required a separate line. For example, the ’119 Patent alleges that “the only quality video transport with assurance that operators can use are dedicated line, virtual private networking services.” *Id.*, 3:23-25. These dedicated line/VPN services were limited in that each new service required a separate VPN, which did not economically scale with more services or users. *Id.*, 3:25-29. Further, the ’119 Patent alleges that prior art systems addressed to the core network only or to the access network only, and thus failed to provide quality assurance from originating end-point to terminating end-point. *Id.*, 2:6-3:2. That is, the prior art allegedly did not provide *end-to-end* quality assurance. *See id.*

59. To address these perceived shortcomings, the ’119 Patent offers “an improved unique system and method of providing bandwidth on demand for an end user and/or enterprise” from “end to end.” ERIC-1001, 4:46-48, 3:46-48. To do so, the ’119 Patent purports to separate control processing from data transport to manage services end-to-end with a “controller” in charge of a physically separate "portal" for a connection between an "originating end-point" and a "terminating end-point." ERIC-1001, 4:64-5:6. A control path extends between the end-points and the controller and between the controller and the portal. A bearer path for data extends between the end-points.

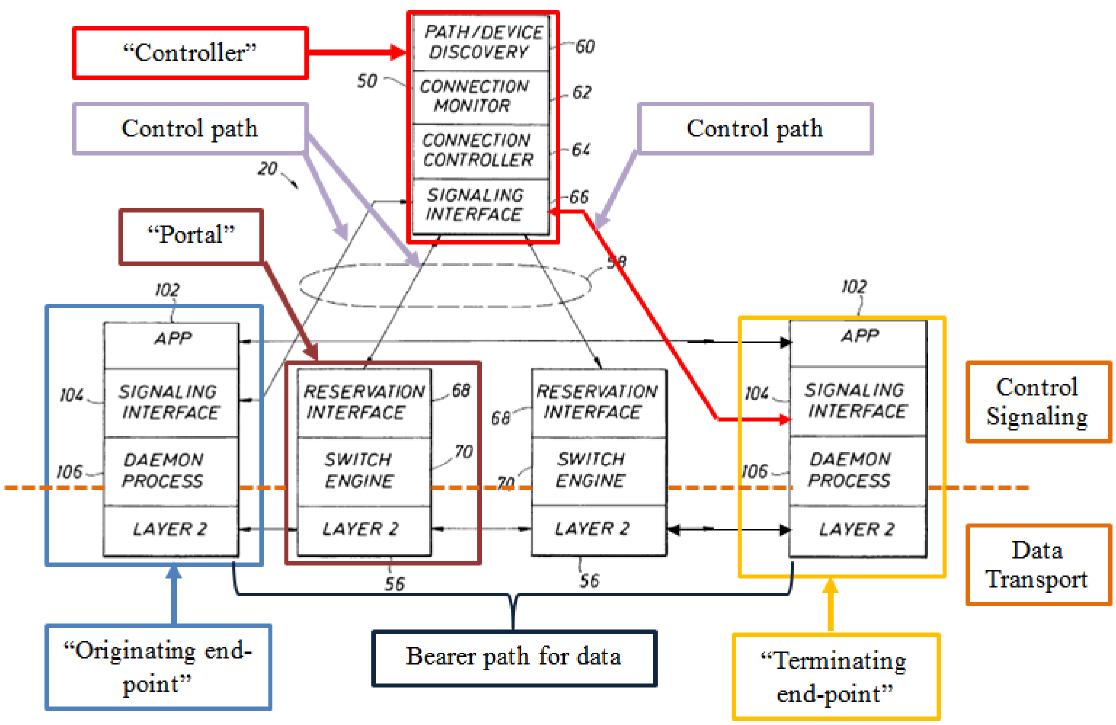
60. An example of this architecture is shown in FIG. 7:



ERIC-1001, FIG. 7 (annotated).

61. However, the solution proposed by the '119 Patent was not unique or new. Before the earliest alleged priority date of the '119 Patent, others had already developed a system to provide end-to-end bandwidth assurance using a physically separate controller and portal platform.

62. For example, the Golden reference discloses an identical method for end-to-end QoS over the efforts then available, specifically establishing "on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network." ERIC-1007, 1:14-18. Golden discloses the separation of control functions from packet transmission functions into two physically separate entities: (1) an "enterprise control point" ("ECP," i.e., controller) that assures end-to-end bandwidth, and (2) a "switch" (i.e., portal) that handles packet transmission based on routing instructions from the controller. An example of Golden's end-to-end architecture is illustrated in modified FIG. 9:



ERIC-1007, FIG. 9 (modified and annotated).

63. Golden provides the requested quality of service, including bandwidth, on demand in local or wide area networks "between any endstations within the network" (i.e., end-to-end). ERIC-1007, 1:11-22. Golden discloses the separation of control processing from data transport to manage services from end-to-end using the "enterprise control point," or "ECP." ERIC-1007, 7:44-46. The ECP is disclosed as providing routing instructions to the physically separate portal for a connection extending between an originating end-point (referred to as a host 102) and a terminating end-point (also referred to at times as a host 102). ERIC-1007, 13:23-30, 37-41. Identical to the embodiment of FIG. 7 of the '119 Patent, a control path extends between the end-points and the controller and between the controller and the portal, and a bearer path for data extends between the end-points.

64. Golden teaches that the originating end-point, a host, dynamically requests reserved connections to terminating end-points from the ECP. ERIC-1007, 14:16-33. The host includes with the request an identification of how much bandwidth is needed for a reserved connection of a requested QoS. ERIC-1007, 15:31-39. Golden further teaches that the ECP communicates with the terminating end-point. ERIC-1007, 15:21-28.

65. In the preferred embodiment of the '119 Patent, the controller receives a request from an end-point for an end-to-end connection having a requested amount of bandwidth. Likewise, Golden's end-point requests from an ECP a reserved connection (e.g., a dedicated bearer path set up by the ECP) meeting a specified service level. In the

’119 Patent, the controller “dynamically provision[s] a dedicated path, including required route and bandwidth, on demand through the network.” ERIC-1001, 5:64-67. Consistently, Golden discloses reserving bandwidth along a specified required route.

66. It is my opinion that Golden in view of Fichou, further in view of Lee, renders obvious at least claims 1-9 and 11-12 of the ’119 patent.

67. It is further my opinion that Golden in view of Fichou and Lee, further in view of Har renders obvious at least claims 10 and 13-15 of the ’119 Patent.

68. It is further my opinion that Golden in view of Fichou, Lee, and Har, further in view of Pillai, renders obvious at least claim 16 of the ’119 Patent.

69. Each of these grounds of invalidity will be addressed below with respect to the claims of the ’119 Patent below.

VIII. Claims 1-9 and 11-12 are unpatentable over 35 U.S.C. § 103 over Golden in view of Fichou and Lee.

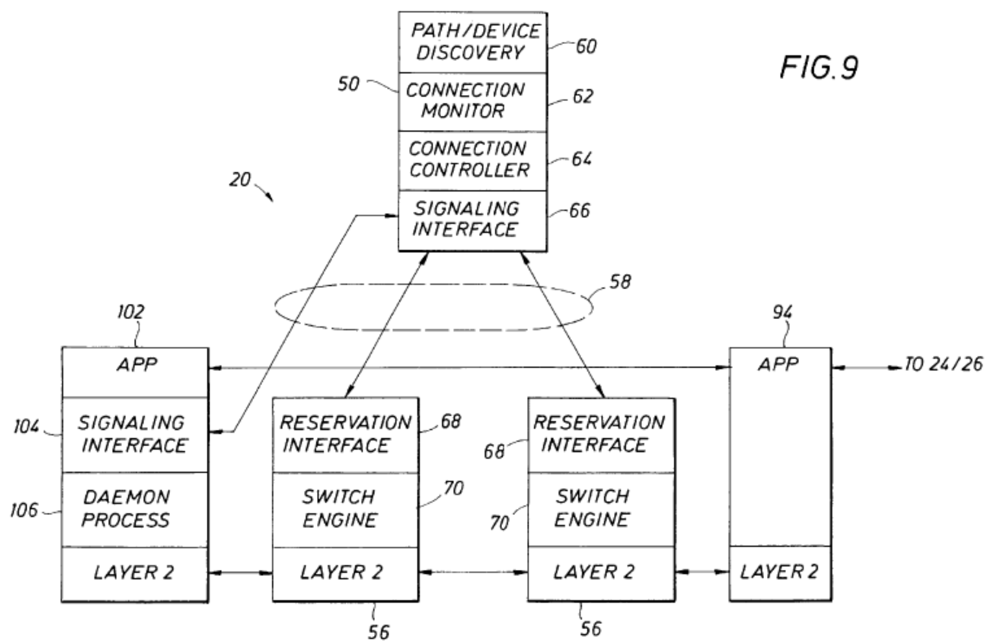
70. It is my opinion that Golden in view of Fichou, further in view of Lee renders obvious at least claims 1-9 and 11-12 of the ’119 Patent.

A. Overview of Golden

71. Golden relates to “a technique for adapting an existing packet-switched/routed infrastructure so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks can be established.” ERIC-1007, 1:11-18.

Recognizing the need for a solution that would have an overview, and control, of resources from "beginning to end," including across different networks, Golden provides an "enterprise control point (ECP) 50" as well as "hosts," Golden's term for the endstations, that communicate with each other. *See* ERIC-1007, 4:53-55, 7:44-46.

72. Golden illustrates an exemplary implementation for its technique in FIG. 9, reproduced below:



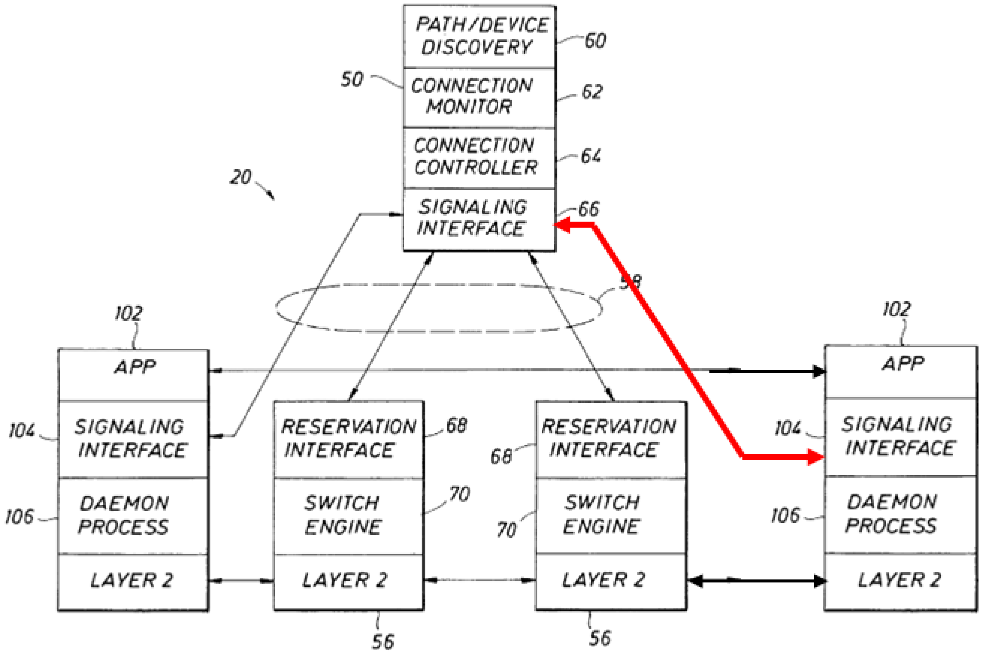
ERIC-1007, FIG. 9.

73. Golden teaches that the ECP 50 may be "a standalone processor and software that communicates with a switch in network 20 as any other endstation." ERIC-1007, 7:63-65. In the ECP 50, a "signaling interface function 66 provides the ability to communicate with switches 56 via a reserved signaling channel 58." ERIC-1007, 8:16-19. The ECP 50 also includes a path/device discovery function 60 that "learns what network elements and paths between endstations exist within the LAN and maintains respective lists of each in network elements registry 57 and path list 59." ERIC-1007, 8:20-23. Golden teaches that the ECP 50 also includes a connection controller function 64 used to set up and tear down reserved connections. ERIC-1007, 8:29-34. There is also a connection monitor function 62 in ECP 50 that maintains records on the different connections, including the elapsed time of the connection, the parties involved, and the resources used by the connection which can be used for billing, charging, and resource management. ERIC-1007, 8:34-39.

74. Golden teaches that "[t]he network elements include endstations such as host 52 and router 54 and switches such as switches 56, as well as the interfaces between them (e.g. switch ports)." ERIC-1007, 8:23-26. The switches 56 in Golden not only include switch engine functions; they also include an "enhanced switch engine 70 that makes forwarding decisions based on a conventional switch table 69 as well as a novel reserved connection pairs list 67." ERIC-1007, 8:41-49. As noted above, Golden's switches 56 also include reservation interface function 68 to communicate with the ECP 50 via the reserved signaling channel 58 about reserved connections. ERIC-1007, 8:53-57. Of note, Golden teaches that the enhanced functionality within switches 56 is applicable to other forwarding devices/routers. ERIC-1007, 8:64-9:8.

75. The hosts in Golden include any host or router, such as conventional workstations with network interface cards. ERIC-1007, 7:47-53 (or, alternatively, a server – ERIC-1007, 15:41-43). In the embodiment of FIG. 9, Golden teaches that the hosts 102 may have "enhanced functionality for directly requesting a reserved connection from ECP 50." ERIC-1007, 13:23-29. To that end, Golden teaches that the hosts 102 include a "daemon process 106 that processes user requests for reserved connections with other hosts within the network or in other networks." ERIC-1007, 13:30-33.

76. A signaling interface 104 sends connect/disconnect messages to the ECP 50 via a reserved signaling channel 58 "[i]n accordance with requested connections processed by daemon process 106." ERIC-1007, 13:33-36. Further, Golden teaches that both endstations may be enhanced hosts 102 that are similarly upgraded. I have updated FIG. 9 below to reflect this by replacing conventional host/router 94 with a similarly upgraded host 102 with corresponding reserved signaling channel 58 to ECP 50 as with the originating endstation:



ERIC-1007, FIG. 9 (modified/annotated to show router 94 replaced with host 102).

77. In an example use scenario, Golden teaches that a user at the host 102 selects a link having a URL from a list of links on a browser 112 in order to request a reserved bandwidth connection. ERIC-1007, 14:7-23. The daemon process 106 is notified of the selection, and the information about the desired connection (e.g., audio, data, teleconference, etc.) is "formatted into a connection request that is forwarded to the signaling interface 104 [of the host 102], which sends the request to ECP 50." ERIC-1007, 14:30-34.

78. Upon receiving the connection request from the host 102, the ECP 50 "check[s] the resources along the path(s) to the requested destination and attempt[s] to secure the desired service." ERIC-1007, 14:34-37. In addition to checking whether the resources along the path are sufficient, the ECP 50 also may "signal directly to host whether to accept the request [for the connection from the originating host]." ERIC-1007, 15:14-21. If there is sufficient bandwidth available along a path, and the destination endstation agrees to the connection, then the ECP 50 "sends a bandwidth reservation to each switch 56 in the path" that includes source and destination of the connection and desired bandwidth in packets per second. ERIC-1007, 10:27-36, 14:53-60.

79. Looking at the functionality from the point of view of the switch 56, Golden teaches that a switch 56 receives bandwidth reservation requests from an ECP 50 via a reserved signaling channel. ERIC-1007, 11:8-12. The switch 56 "stores the addresses and desired bandwidth in connection pairs list 67 [see FIG. 11] and sends an acknowledgment to ECP 50." ERIC-1007, 11:14-17. When a switch 56 receives a packet, the switch 56 checks the contents of its standard switch table 69 for forwarding packets between ports. ERIC-1007, 11:25-30. In addition, Golden teaches that the switch 56:

> compares the addresses in the packet headers with the addresses contained in connection pairs list 67. Specifically, if the source and destination addresses of an incoming packet match both addresses of one of the address pairs stored in its connection pairs list, the packet is forwarded to the port associated with the destination address, which port is designated by its conventional switch table 69. Meanwhile, if the port designated by switch table 69 for one address of an incoming packet matches a port designated by the switch table for any of the

> stored addresses of hosts and routers involved in a reserved virtual circuit connection, but if both addresses of the incoming packet do not match the corresponding address pair stored in its connection pairs list, the packet is dropped.

ERIC-1007, 11:30-45.

80. Golden continues, teaching that "if the switch 56 maintains separate port queues for priority traffic, enhanced switch engine 70 can forward reserved connection packets to high priority queues, while dropping or forwarding to lower priority queues those packets which contend for access to ports involved in reserved connections." ERIC-1007, 11:57-62.

81. Golden teaches that the reserved connection can be terminated when desired, such as by a user of one of the endstations (e.g., hosts 102 in FIG. 9). ERIC-1007, 15:1-3. In response to such a request, the ECP 50 sends bandwidth reservation release requests to the switches 56 in the reserved path, which delete the information in the connection pairs list 67 identified above. *See* ERIC-1007, 11:17-24. This is consistent with Golden's stated focus of enabling "on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks." ERIC-1007, 1:15-18.

82. Thus, Golden teaches an end-to-end QOS assurance solution that operates with an ECP that is separate from both the switches and the endstations, and uses direct reserved signaling channels to each (as well as to the switch/portal). Golden further teaches that the "connection monitor function 62" of the ECP "maintains a permanent list of connections, including respective permanent connection records 65 that show the elapsed time of the connection, the parties involved, and the resources used." ERIC-1007, 8:34-37. Golden teaches that these records kept by the ECP "can be used for billing and resource management." ERIC-1007, 8:38-39. Further, Golden teaches that the ECP can be used to "communicate with a policy server within the network for further determination on whether to admit the connection" when a connection request is received from a host. ERIC-1007, 10:9-12.

B. Overview of Fichou

83. Fichou describes a system for authorizing a user for a requested connection. In general, Fichou teaches "[a] method and system for reserving a virtual connection from a source workstation to a destination workstation." ERIC-1008, ¶ [0010]. Fichou accomplishes this with the use of a reservation server 26. *See* ERIC-1008, ¶ [0021]. Fichou teaches that a source workstation 10 may "deliver a reservation request to reservation server 26 when required to accommodate a Quality of Service (QoS) requirement for a particular application." ERIC-1008, ¶ [0022]. The source workstation 10 may include, in the request, such things as "destination, bandwidth, Quality of Service, type protocol or port number." ERIC-1008, ¶ [0023].

84. The request may be direct between the source workstation 10 and the reservation server 26. ERIC-1008, ¶ [0022]. In response to the request, Fichou teaches that the reservation server 26 “performs user authentication and determines whether or not the reservation can be granted to this user.” ERIC-1008, ¶ [0022]. User authentication may include, according to Fichou, logon/password verification or more sophisticated authentication. ERIC-1008, ¶ [0024].

85. After user authentication, Fichou teaches that the reservation server 26 performs “user rights verification.” ERIC-1008, ¶ [0025]. The information for the verification is drawn from a database that “defines for each user which kind of request he is allowed to perform.” ERIC-1008, ¶ [0025]. “The result of such a verification may be in terms of bandwidth required for a call, destination allowed, QoS, etc.” ERIC-1008, ¶ [0025].

86. As a result, if the request is validated, the reservation server 26 proceeds with assessing the networks capability to handle the request. ERIC-1008, ¶ [0026]. This includes determining “the remaining capacity, or bandwidth, of each link in the network.” ERIC-1008, ¶ [0026]. If there is sufficient capacity for the reservation request, “a flow identification is set … [which] includes not only a FlowID field, but also parameters such as source address, destination address, QoS, port number, duration, bandwidth, route or path within the network.” ERIC-1008, ¶ [0027].

C. Reasons to Combine Golden and Fichou

87. It is my opinion that one of ordinary skill in the art would have been motivated to combine the teachings of Golden and Fichou for the reasons set forth below.

88. Golden contemplated that the ECP 50 performs various control functions relating to "setting up and tearing down reserved connections" by way of the ECP's "connection controller function 64." ERIC-1007, 8:29-31. Golden teaches that this is "in response to sessions using ***existing and emerging protocols such as RSVP*** in a manner that will be described in more detail below." ERIC-1007, 8:31-34 (emphasis added).

89. Golden also contemplated that the ECP 50 would include additional control functions related to records and billing and resource management: "Connection monitor function 62 maintains a permanent list of connections, including respective permanent connection records 65 that show the elapsed time of the connection, the parties involved, and the resources used. Such records can be used for ***billing and resource management***, for example." ERIC-1007, 8:34-39 (emphasis added).

90. A person having ordinary skill in the art would have understood resource management to include a variety of aspects. Golden teaches the desirability of first determining whether to admit a connection in a network: "[i]t should be noted that, alternatively or additionally, ECP 50 could communicate with a policy server within the network ***for further determination on whether to admit the connection***." ERIC-1007, 10:9-12 (emphasis added). Golden does not provide further detail about criteria for admitting a connection, but the criteria for deciding whether to admit a connection of the type contemplated by Golden was well known and would have been obvious to a person having ordinary skill in the art. Thus, a person having ordinary skill in the art would have been motivated to look to other teachings in the art to confirm, with more detail, well-known criteria a policy server would use to assist in determining whether to admit a connection, as shown in Fichou.

91. Fichou provides an example of a reservation server, similar to Golden's ECP, that also assists in further determining whether to admit a connection. Fichou teaches that the criteria for admission may include verifying whether the user has the rights to use the requested QoS for the connection (i.e., is authorized). Fichou is directed to "reserving virtual connections having a designated Quality of Service (QoS) in an Internet Protocol (IP) network, and relates in particular to a system and method for reserving a QoS designated virtual connection in a network equipped with a reservation server." ERIC-1008, ¶ [0002]. "When source workstation 10 wants to send data packets to another workstation such as destination workstation 32, a virtual connection through backbone nodes such as backbone node 34 is established by reservation server 26 between source workstation 10 and destination workstation 32." ERIC-1008, ¶ [0021].

92. Fichou teaches that the reservation server engages in "user rights verification" based on definitions of what kinds of requests (i.e., relating to bandwidth, destination, QoS, etc.) that each user is allowed to make. ERIC-1008, ¶ [0025]. Applying Fichou's teachings about verification by a reservation server to Golden's policy server, whether separate or "incorporated within the existing functionality" of an ECP, provides the advantage of "provid[ing] a way for the customer to manage the authorization for each user of the source workstation." *Id.*

93. Thus, a person having ordinary skill in the art would have been motivated to look to Fichou's verification teachings as a particular example of "further determination on whether to admit the connection" as taught in Golden.

94. The combination of Golden's ECP and policy server and Fichou's teachings with respect to verification by a reservation server that is remote from a requesting workstation would have been predictable in order to implement the "further determination on whether to admit a connection" in Golden. Golden already acknowledges an ability to interface with another function of a policy server, whether internally in the ECP or elsewhere in the network. Fichou's teachings regarding its reservation server is nothing more than a well-known example of what Golden would have been able to implement with respect to determining whether to admit a connection.

95. Further, implementation of the verification teachings of the reservation server in Fichou with the policy server teachings of Golden would have been within the ability of a person having ordinary skill in the art. In particular, the ECP in Golden is taught as being remote from both the hosts (i.e., 102 of FIG. 9) and switches 56. Similarly, Fichou teaches that the reservation server is separate from the "workstations" and nodes in a network. *See* ERIC-1008, FIG. 1. Thus, the controllers/servers in Golden and Fichou are both already designed to be separate from the end points they serve.

96. To the extent that any modifications would have been needed to the teachings of Golden in order to accommodate the teachings of Fichou, such modifications would have also been within the level of ordinary skill in the art. Golden teaches that the ECP "could communicate with a policy server within the network ***for further determination on whether to admit the connection***." ERIC-1007, 10:9-12 (emphasis added). Fichou's teachings provide an obvious implementation detail that a person having ordinary skill in the art would have been motivated to include when implementing the system of Golden. Thus, a person having ordinary skill in the art would have been able to incorporate the teachings of Fichou in Golden with predictable results.

97. This predictable and desirable combination would yield a system with the ability to perform verification on reservation requests by ensuring the user was authorized to use the requested QoS, as taught by Fichou, from hosts sending the requests as taught by Golden.

D. Overview of Lee

98. Lee teaches that guarantees for end-to-end QoS include "the guarantee for service bandwidth, delay, jitter, loss and the like." ERIC-1009, ¶[0006]. To aid MPLS in providing such QoS guarantees, Lee describes "an apparatus and a method of centralized control of a MPLS [multiprotocol label switching] network capable of minimizing a message exchange between respective switches in the MPLS network." ERIC-1009, ¶ [0003]. Lee teaches that the MPLS network includes "at least one label switching network element," which Lee also refers to simply as an MPLS switch. *Id.* at ¶¶ [0016], [0028]. The centralized control apparatus in Lee "compute[s] an LSP [label switched path] of the MPLS network" on behalf of the MPLS switches in the network. *Id.* at ¶¶ [0016], [0034].

99. Lee teaches that the centralized control apparatus sends the computed LSP "to the respective MPLS switches via an LSP activation section 304." *Id.* at ¶ [0057]. This setting to the MPLS switches constitutes a transmission of information. Lee teaches that this information "transmitted to the respective MPLS switches is Forward Equivalence Classes (FEC) information, lower class level interface topology information, class to EXP mapping information, Label

Forwarding Information Base (LFIB) information and so on." *Id.*

100. LFIB information is the information used by MPLS switches when performing lookups for forwarding packets received that include an MPLS label (as opposed to using a routing table). Lee teaches that the LFIB "is the MPLS label switching information that the respective MPLS switches should proceed and which can include an input label, an output label, an output interface and so on." *Id.* at ¶ [0058].

E. Reasons to Combine Golden and Lee

101. It is my opinion that one of ordinary skill in the art would have been motivated to combine the teachings of Golden and Lee for the reasons set forth below.

102. Golden contemplates that its invention would apply to various protocols, "using both conventional and novel reservation protocols and frame formats." ERIC-1007, Abstract. In particular, Golden teaches that the "[c]onnection controller function 64 is responsible for setting up and tearing down reserved connections within network 20 in response to sessions using existing and emerging protocols such as RSVP in a manner that will be described in more detail below." *Id.* at 8:29-34.

103. Golden taught "a technique for ***adapting an existing packet-switched/routed infrastructure*** so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks can be established, ***while providing interoperation with and improving the performance of existing reservation protocols and frame formats***." *Id.* at 1:14-21 (emphasis added). This solution applied as well to the challenge of allowing interoperability between different protocols in the same or different networks between source and destination endpoints, with the use of enterprise control points: "[t]he enterprise control point identifies a path within the network that can satisfy the requested QOS/COS and reserves the requested resources all along the path from beginning to end." *Id.* at 5:47-50.

104. Golden taught that the network elements include MPLS switches. *See* ERIC-1007, 8:20-26, 16:19-29, and 20:34-41. A person having ordinary skill in the art would have understood, therefore, that Golden (1) contemplated the use of MPLS switches in its network and thus under the control of enterprise control points; (2) taught the determination of paths through the network for a requested connection by the enterprise control points; and (3) taught that the enterprise control points would provide instructions to switches along the path determined for a requested high QoS connection.

105. However, Golden is silent concerning specific details of implementing an MPLS system. (relying on the common knowledge of a POSITA to know and understand those basic networking details). Fichou has a little more detail, teaching that the reservation server distributes a “FlowID” which can be an MPLS label. ERIC-1008, ¶ [0030]. Thus, a person having ordinary skill in the art would have been motivated to fill in specific implementation details of an MPLS system, based on what a POSITA would have had knowledge and understanding of (such as from the teachings of Fichou), and it would have been obvious to use that knowledge to implement control of Golden’s MPLS routers within the ECP of Golden as modified by Fichou.

106. Lee taught the usefulness of centralizing network management to a centralized control point. Lee noted that distributed control for an MPLS network results in “a complicated protocol … for the setting and management of LSP.” ERIC-1009, ¶ [0011]. Likewise, Lee taught that its centralized control system would find use in networks “including at least one label switching network element [e.g., MPLS switch].” ERIC-1009, ¶ [0016]. Lee therefore taught the use of a centralized control apparatus for an MPLS network where there is at least one MPLS switch in order to reduce the complexity and thereby reduce a load generated by an MPLS switch in the network. *Id.* at ¶¶ [0015], [0016].

107. In particular, “the present invention performs all of the computation and setting of the LSP and topology/resources, resource information and fault management and so on in the MPLS network by using a centralized control apparatus, thereby simplifying the operation and management of the network." *Id.* at ¶ [0030]. In view of Lee's centralized MPLS control teachings, a natural selection for the POSITA to implement such functionality in Golden would have been the ECP.

108. A person having ordinary skill in the art, reading Golden and Fichou, would have thus been motivated to look to other teachings in the art for detail and understanding of what was already known with respect MPLS including interactions with MPLS switches, and turned to Lee with its exemplary teachings of MPLS switch interaction with a centralized control system. Lee teaches particular details about what instructions are sent to MPLS switches after a centralized system (i.e., the ECP in Golden) makes route determinations in response to a connection request. Lee's details include the LFIB sent as the information to MPLS switches and that the MPLS switches, upon receiving the information including LFIB, would use the LFIB for forwarding packets instead of routing according to its own routing table.

109. Using the teachings of Lee regarding details of the MPLS switch instructions for supporting a guarantee for service bandwidth, delay, jitter, loss and the like, in combination with Golden's teachings regarding bandwidth reservation determinations at the ECP and the transmission of the instructions to switches in the path, and Fichou's teachings regarding distribution of FlowID's, would have been within the skill of a person having ordinary skill in the art. Golden taught the desirability of the ECP being able to interact with and control various existing and emerging protocols, including MPLS. Implementing the teachings of Lee would have allowed a reduction of load imposed on the MPLS switches in Golden, as Lee taught (e.g., via advanced control functions occurring at the ECP instead, per Lee's teachings). *See* ERIC-1009, ¶ [0013].

110. Accordingly, a person having ordinary skill in the art would have been motivated to look to Lee and combine Lee's teachings regarding details of control of MPLS switches because Golden designed its system to operate with existing protocols such as MPLS (as did Fichou) but did not include many details about that particular interoperation. Lee taught the advantages of reduced load imposed on the MPLS switches by offloading the LSP calculations to a centralized control system (such as the ECP in Golden). The predictable and desirable result of such a combination would be a system with the ability to make route determinations/reservations at a centralized control point (Golden's ECP, Fichou's reservation server), as taught by Golden and as also taught be Lee, with the particular MPLS information details as taught by Lee that is provided to MPLS switches in the determined path.

F. Detailed Analysis

1. <u>Independent Claim 1</u>

[1.0] ***A method for providing bandwidth on demand comprising:***

111. Golden teaches a method for providing bandwidth on demand.

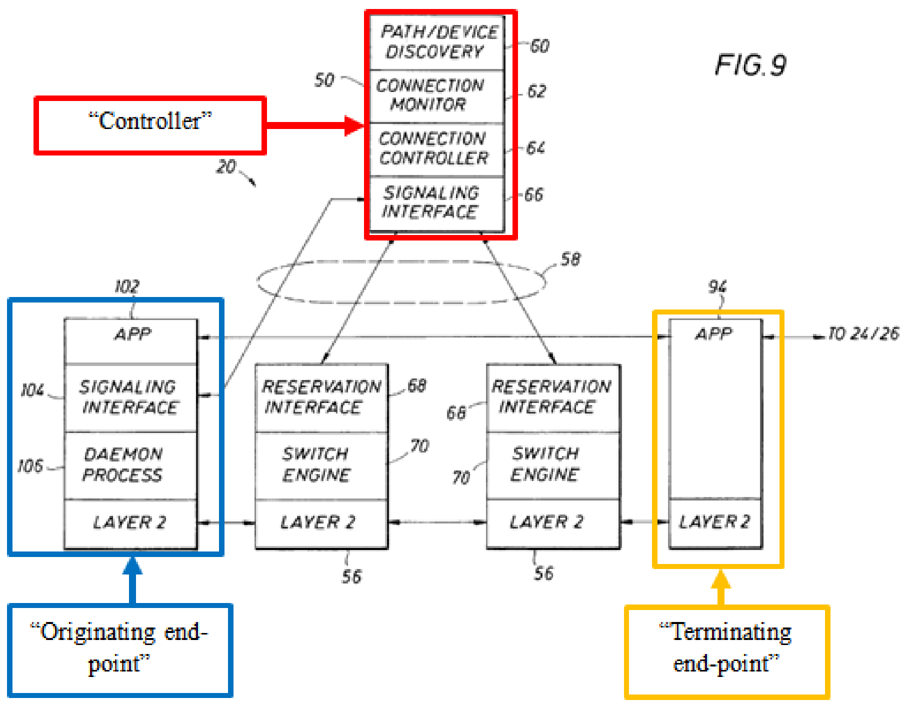
112. According to Golden, "[t]he present invention relates to a method and apparatus for providing guaranteed quality and/or class of service (QOS/COS) in a local or wide area network or across networks, and more particularly, to a technique for adapting an existing packet-switched/routed infrastructure ***so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks can be established***, while providing interoperation with and improving the performance of existing reservation protocols and frame formats." ERIC-1007, 1:11-21 (emphasis added).

113. Thus, because Golden teaches on-demand reserve-bandwidth connections between endstations, it teaches "a method for providing bandwidth on demand" as recited in the claim.

[1.1] ***receiving, by a controller positioned in a network, a request for a high quality of service connection supporting any one of a plurality of one-way and two-way traffic types between an originating end-point and a terminating end-point,***

114. Golden teaches receiving, by a controller positioned in a network, a request for a high quality of service connection supporting any one of a plurality of one-way and two-way traffic types between an originating end-point and a terminating end-point.

115. First, Golden teaches a controller (e.g., ECP 50) positioned in a network (e.g., network 20), as well as an originating end-point (e.g., host 102) and a terminating end-point (e.g., host 94 or modified as host 102):

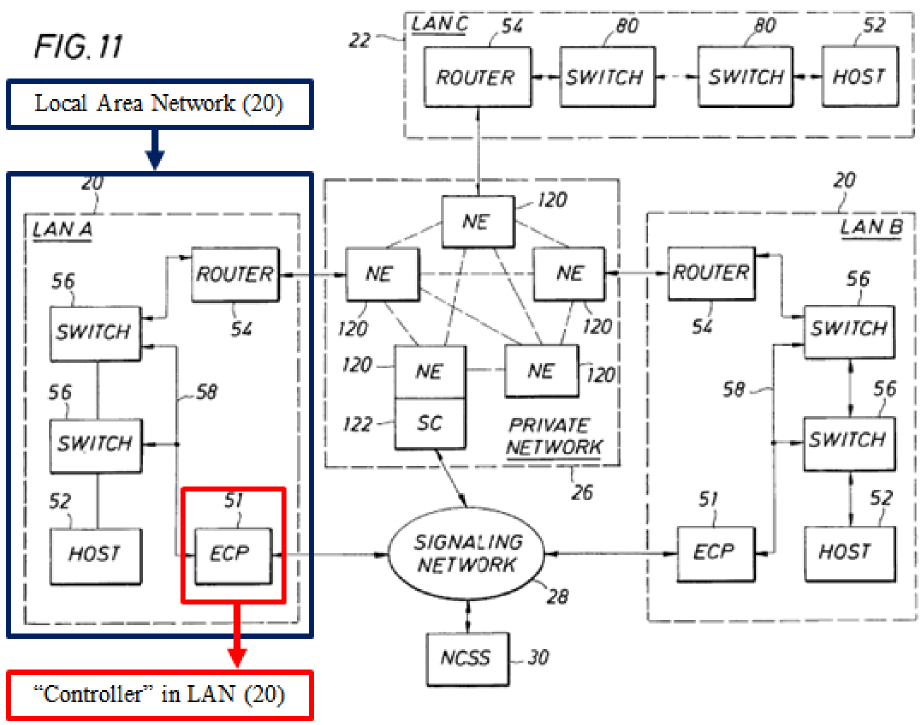


ERIC-1007, FIG. 9 (annotated).

116. FIG. 9 illustrates "enterprise control point 50," which is a "controller": "[i]n accordance with requested connections processed by daemon process 106, signaling interface 104 sends connect/disconnect messages ***to ECP 50*** via reserved signaling channel 58." ERIC-1007, 13:34-37 (emphasis added).

117. The ECP 50 is in a network: "[i]n this embodiment, differently from the above-described embodiments, ***the network includes*** one or more hosts 102 that have been configured with enhanced functionality for directly requesting a reserved connection from ***ECP 50*** similarly as described in the co-pending application Ser. No. 09/060,520." ERIC-1007, 13:23-30 (emphasis added).

118. The network 20 identified in FIG. 9 is illustrated again as examples of various LANs according to embodiments of Golden that support operation for "inter-network reserved connections in addition to reserved connections within a local network":



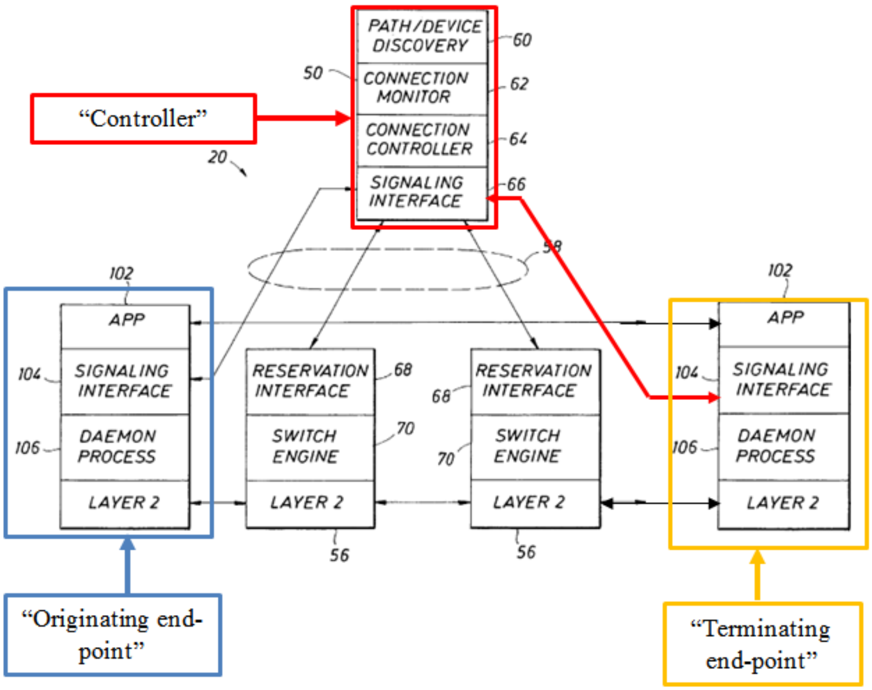
ERIC-1007, FIG. 11 (annotated).

119. The ECP 50 illustrated in FIG. 9 is described in more detail with respect to Figures 4 and 5: "[t]his embodiment is designed to provide local network interoperation with application layer reservation protocols such as RSVP. As shown, it includes ***enterprise control point (ECP) 50***, host 52, router 54 and intermediate switches 56." ERIC-1007, 7:42-46 (emphasis added).

120. Further, Golden teaches that "ECP 50 is … a standalone processor and software that communicates with a switch in network 20 as any other endstation …" ERIC-1007, 7:63-65. "***The enterprise control point identifies a path within the network*** that can satisfy the requested QOS/COS and reserves the requested resources all along the path ***from beginning to end***." ERIC-1007, 5:47-50 (emphasis added).

121. Golden teaches an originating end-point and a terminating end-point: "[t]he ***network elements include endstations*** such as host 52 and router 54 and switches such as switches 56, as well as the interfaces between them (e.g. switch ports)." ERIC-1007, 8:27-30 (emphasis added). The endstations are illustrated in FIG. 9 as "hosts 102" and "conventional host/router 94": "the network includes ***one or more hosts 102*** …." ERIC-1007, 13:25-27; 13:37-38 (emphasis added). "Although FIG. 9 illustrates an example where host 102 is communicating with a conventional host/router 94, it should be apparent that ***host 102 can also communicate with other hosts similarly upgraded as host 102***." ERIC-1007, 13:36-40 (emphasis added).

122. Thus, the "conventional host/router 94" may be also modified to be an upgraded host 102 as well, which I illustrate in my annotated FIG. 9 below:



ERIC-1007, FIG. 9 (modified and annotated to show terminating end-point 102).

123. The hosts 102 (host 94 is also an endpoint) are endpoints because, according to Golden, they are "endstations" and the ones that request the reserved connections and are the targets to receive communications. *See, e.g.*, ERIC-1007, 8:23-26; 13:31-41.

124. **Second**, Golden teaches that the controller (e.g., ECP 50) receives a request from an originating endpoint (e.g., host 102): "the network includes one or more hosts 102 that have been configured with enhanced functionality for ***directly requesting a reserved connection from ECP 50*** …" ERIC-1007, 13:23-27 (emphasis added). The request is received at the ECP 50 from an endstation host 102 that includes a signaling interface process 104 and a daemon process 106. *See*

ERIC-1007, 14:9-10. "Signaling interface process 104 … ***sends requests for origination or termination of reserved connections to ECP 50*** upon command from daemon process 106." ERIC-1007, 14:2-8 (emphasis added). The controller acts on the request when it receives it: "ECP 50 then processes the request similarly as described above by checking the resources along the path(s) to the requested destination and attempting to secure the desired service." ERIC-1007, 14:34-37.

125. The request is for a quality of service connection: "[a]lthough the process of ***requesting a reserved connection*** has been described above with reference to the example of a user interface process interacting with a user to select a type of connection, it should be apparent that many alternatives are possible. For example, additional layers of software can be built into applications that automatically ***request a connection***, determine the type of connection to be made, ***and how much bandwidth and what quality or class of service to request for such connection***." ERIC-1007, 15:31-39 (emphasis added).

126. The ECP uses the request that it receives to "determine[] the overall capacity of the first available path … whether the minimum bandwidth available through each link, switch, and switch port in the path will be sufficient to ***fulfill the bandwidth and/or quality of service*** requested for the connection." ERIC-1007, 9:61-66 (emphasis added).

127. Golden teaches that the connections support any one of one-way or two-way traffic types: "[i]t is important to note that this approach does not compromise the fundamental ability of switch 56 (be it a level 2 switch or level 3 router or switch) to share traffic loads with various classes of traffic. It only gives ***QOS/COS traffic*** preferred access to the available bandwidth of a switch or router port." ERIC-1007, 11:48-53 (emphasis added).

128. It would have been obvious to those having ordinary skill in the art that traffic traversing a supporting connection would be any one of one-way or two-way traffic types. For example, Golden states: "Daemon process 106 invokes user interface process 108, which draws a dialog box on the host's display asking the user to specify what kind of connection is desired (e.g., audio only, data only, teleconference, etc.)." ERIC-1007, 14:26-30. Golden further teaches that traffic may be in the form of video or audio conferences: "[a]dditional functionality can also be built in to launch a software application desired for that connection (such as a video or audio conference)." ERIC-1007, 14:60-62. Both of these, teleconferencing and audio conferencing, are examples of at least two-way traffic types.

129. **Third**, Golden teaches that the request is for a high QoS connection because it provides similar example applications, such as "video conferencing," as the '119 Patent. According to the '119 Patent, "high quality bandwidth on demand services" include "video and gaming applications." ERIC-1001, 5:23-26. During prosecution of the '612 Patent, Patent Owner identified "the boxed set of applications on the left side of Fig. 3" as examples of pre-existing "high QoS" applications. ERIC-1004, p.51. FIG. 3 identifies examples of applications that have high QoS requirements, including ***video conferencing***, file sharing, distance learning, SD video on demand, multi-player gaming, telemedicine, Realtime video, HD video multicasting, network hosted software, and video from studio. ERIC-1001, FIG. 3.

130. Counsel has informed me that claim terms are understood to encompass disclosed embodiments in the absence of clear disavowals of claim scope. With that in mind, I observe that the recital in claim 1 should cover at least the high quality of service application requirements in FIG. 3, identified by the Patent Owner during prosecution, and the related description in the '119 Patent. To that end, Golden provides examples of applications that receive a requested QoS, which would have similar parameters to those in the '119 Patent.

131. In Golden, the originating end-point determines the type of connection to request, including bandwidth amount and QoS. ERIC-1007, 15:35-39. Golden identifies applications for which the bandwidth is requested as "real time applications such as ***video conferencing***." *Id.*, 1:43-47; *see also* 14:60-62 (video or audio conferencing). Further, Golden identifies connections that provide lower

QoS, including best effort connections: "[i]f bandwidth on a port has been reserved by the ECP but priority packets are not arriving to make use of that bandwidth, 'best effort' packets can and will be allowed to be forwarded through that port." ERIC-1007, 11:53-56.

132. A person having ordinary skill in the art would have known that QoS connections would have several different parameters associated with it including bandwidth, as well as (in certain applications) latency and packet loss. Golden teaches that the bandwidth requested is part of a QoS request for the end-to-end connection. ERIC-1007, 1:11-21; 9:61-66. Further, Golden in combination with Lee teaches that guarantees for end-to-end QoS includes "the guarantee for service bandwidth, delay, jitter, loss and the like." ERIC-1009, ¶[0006]. Patent Owner agreed that these parameters were all well-known, stating that bandwidth, packet loss, and latency requirements "are commonly used parameters." ERIC-1004, p.51.

133. Further, FIG. 3 of the '119 Patent identified that it was already known for video conferencing to have bandwidth on the order of 1 Mbps, with packet loss of 10^{-5} and latency of less than 400 ms round trip time. ERIC-1001, FIG. 3. Accordingly, a person having ordinary skill in the art would have recognized Golden, which teaches guaranteeing a requested QoS service end-to-end for real-time video conferencing, would have had similar parameters associated with its bandwidth request including delay, loss, and jitter as taught by Lee and acknowledged by the ’119 Patent.

134. Golden teaches that the quality of service connection constitutes a connection that assures at least a bandwidth parameter of the connection from end-to-end: “[a]ccordingly, an object of the present invention is to provide ***reserved bandwidth*** and QOS/COS virtual circuit reserved connections in a local area network … an[other] object of the present invention is to provide ***reserved bandwidth*** and QOS/COS virtual circuit reserved connections between local area networks using both conventional and novel reservation protocols and frame formats.” ERIC-1007, 5:18-27 (emphasis added).

135. Golden teaches that the ECP 50 assures that the bandwidth parameter is supported end to end: “[the ECP 50] then determines the overall capacity of the first available path by ***determining from network elements registry 57 whether the minimum bandwidth available through each link, switch, and switch port in the path will be sufficient to fulfill the bandwidth and/or quality of service requested for the connection***. Connection controller function 64 reduces the bandwidth available through each link, switch, and switch port in the path, and thus the overall capacity of the path, in accordance with bandwidth consumed by currently existing connections listed in its current connection list 63.” ERIC-1007, 9:60-10:3 (emphasis added).

136. Further, to the extent that the parameters of a requested high quality of service connection vary according to application, Golden teaches that the assured bandwidth parameter is based on the requirements of the particular application: "[f]or example, additional layers of software can be built into applications that automatically request a connection, ***determine the type of connection to be made, and how much bandwidth and what quality or class of service to request for such connection***." ERIC-1007, 15:35-39 (emphasis added).

137. Golden identifies some exemplary applications for which the bandwidth is requested: "with the proliferation of new technologies using real time applications such as ***video conferencing*** and ***Internet telephony***, guaranteed quality of service (QOS) with minimal and predetermined transmission latency has become increasingly desired." ERIC-1007, 1:43-47 (emphasis added). "Additional functionality can also be built in to launch a software application desired for that connection (such as a ***video*** or audio ***conference***)." ERIC-1007, 14:60-62 (emphasis added).

138. A person having ordinary skill in the art would have recognized that a "guaranteed" QOS that supports real time applications "such as video conferencing and Internet telephony" have bandwidth parameters as well as potentially latency and/or packet loss parameters to reserve in the connection. Indeed, the '119 Patent identifies a list of "High QoS Enabled Broadband Applications" that includes "Video Conferencing" as such an application. *See* ERIC-1001, FIG. 3.

139. **Fourth**, Golden teaches that the connection is between the originating and terminating end-points: "The enterprise control point identifies a path within the network that can satisfy the requested QOS/COS and reserves the requested resources all along the path ***from beginning to end***." ERIC-1007, 5:47-50 (emphasis added). "ECP 50 then processes the request similarly as described above by checking the resources along the path(s) ***to the requested destination*** and attempting to secure the desired service." ERIC-1007, 14:34-37 (emphasis added). Because the request is from the originating end-point in Golden, and the ECP identifies the path from beginning to end including the requested destination, Golden teaches that the connection is between the end-points.

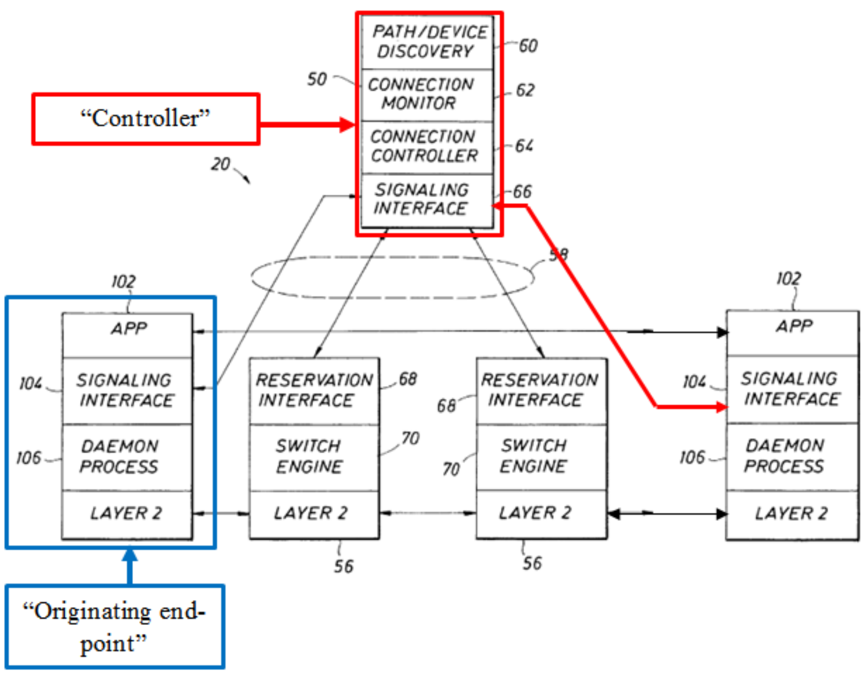
140. Thus, Golden's ECP receiving requests for QoS connections from host endpoints, the requested QoS supporting real-time video conferencing between endstations, teaches "receiving, by a controller positioned in a network, a request for a high quality of service connection supporting any one of a plurality of one-way and two-way traffic types between an originating end-point and a terminating end-point" as recited in the claim.

[1.2] ***wherein the request comes from the originating end-point and includes at least one of a requested amount of bandwidth and a codec;***

141. Golden teaches that a request comes from the originating end-point and includes at least one of a requested amount of bandwidth and a codec.

142. First, Golden teaches that the request comes from the originating end-point: "the network includes one or more ***hosts 102 that have been configured*** with enhanced functionality ***for directly requesting a reserved connection from ECP 50*** …" ERIC-1007, 13:23-27 (emphasis added).

143. "Daemon process 106 then waits for messages from either the browser 112 (via browser plug-in application 110), ***requesting that a reserved connection be initiated*** or terminated … This information is returned to daemon process 106 and ***formatted into a connection request*** that is forwarded to signaling interface 104, ***which sends the request to ECP 50***." ERIC-1007, 14:9-33 (emphasis added). This is illustrated in annotated FIG. 9 below:



ERIC-1007, FIG. 9 (modified and annotated).

144. Second, Golden teaches that the request includes a requested amount of bandwidth: "[f]or example, additional layers of software can be built into applications that automatically request a connection, determine the type of connection to be made, and ***how much bandwidth*** and what quality or class of service ***to request for such connection***." ERIC-1007, 15:35-39 (emphasis added). This description in Golden of "applications that … request a connection" refers to the applications at the host 102 of FIGs. 9 and 10.

145. "The reservation includes the source and destination of the connection … ***and the desired bandwidth in packets per second***, for example." ERIC-1007, 10:30-36 (emphasis added). "ECP 50 then determines whether a path exists that can provide the ***requested service*** … ***between the source and destination hosts***, as described in the forwarded header information. In the process, ECP 50 first ***maps the requested service level to a bandwidth*** or latency ***requirement***, for example by using a stored table." ERIC-1007, 12:56-62 (emphasis added).

146. Because Golden teaches that the request includes the requested service, and because this maps to a bandwidth, Golden teaches that the request includes a requested amount of bandwidth. Accordingly, by teaching a request that includes a desired bandwidth from the originating end-point to the ECP, Golden teaches the limitation for "at least one of a requested amount of bandwidth …".

147. It would have been obvious for a person having ordinary skill in the art to look at the reservation request language at column 10 (associated with FIG.

6), as well as the mapping language at column 12 (associated with FIG. 8) of Golden, because with respect to the embodiment in FIGs. 9 and 10, Golden teaches: "ECP 50 then processes the request similarly as described above," where "above" relates to the discussion of the ECP 50 corresponding to the other embodiments in Golden (i.e., including the embodiment of FIG. 8). *See* ERIC-1007, 14:34-35 (emphasis added).

148. **Third**, to the extent the limitation also requires a codec, it would have been obvious to a person having ordinary skill in the art for a requested codec to be included in the request with the desired bandwidth. This was a known alternative to a person having ordinary skill in the art. It would have been desirable to include multiple messages in the same request to increase the efficiency of the system, e.g. by reducing system overhead with fewer setup messages.

149. Different services required the use of codecs. For example, Golden teaches that it supports "real time applications such as ***video conferencing***." *Id.*, 1:43-47; *see also* 14:60-62. For real time applications, such as real time video conferencing, codecs permit the sender to transmit video data according to a coding standard to ease the transmission requirement.

150. At the time of the earliest priority date of the '119 Patent, compression via a codec was a common practice for the streaming of real time data, including for video conferencing. As was known by a person having ordinary skill in the art, compression, such as by a codec, reduced a bit rate required for transmission. Indeed, per the '119 Patent's Background, "[v]ideo transmission ***requires compression*** in order to effectively utilize the available broadband bandwidth across packet domains." ERIC-1001, 3:31-33. For example, the video conferencing application envisioned by Golden would have employed "compression" by a codec to ease "[v]ideo transmission" requirements.

151. For example, Chen II describes that "video conferencing is widely used" for two-way interactive exchanges or one-way broadcasts "for providing real-time transmission of video and sound between two or more sites." ERIC-1029, ¶ [0005]. Chen further describes that the "overall quality of a video conference depends on a number of factors, including … the quality and capabilities of ***the video conferencing system's basic component: the codec*** (coder/decoder)." *Id.* (emphasis added).

152. A person having ordinary skill in the art would have known that the codec being utilized by the originating end-point would be communicated to at least some intermediate point, if not the receiver, to ensure that the terminating end-point can handle the requested service for Golden's end-to-end connection. Further, a POSITA would have known that a request for connection would include at least one codec for the video conferencing application (in addition to the requested bandwidth), in the same request. *Id.* This is demonstrated, for example, by Har, which states that an originating end-point (EP-1 in Har) sends a setup request, which includes a codec list, to a gateway. ERIC-1010, ¶ [0041] ("the gateway GW extracts the codec list of EP-1 from the Q.931 setup message").

153. Thus, it would have been obvious to a person having ordinary skill in the art that the request in Golden for a reserved QoS connection for video conferencing, as an example, would have also included a request for a codec. Therefore, a POSITA reading Golden's teachings of providing a guaranteed QoS connection for a requested "video conferencing" application would have understood such real time applications as "video conferencing" to include the "basic component" of a codec.

154. Thus, Golden's requests for reserved connections from hosts, and that identify requested service that maps to bandwidth requirements, teach "wherein the request comes from the originating end-point and includes at least one of a requested amount of bandwidth and a codec" as recited in the claim.

[1.3] ***determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the codec***

155. The combination of Golden and Fichou teaches determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the codec.

156. **First,** Golden teaches authorization with respect to use of a network: "[routing function 133] can also perform security functions that provide additional safeguards against ***unauthorized use*** of the broadband network by, for example, further screening the destination and source addresses of the packets and comparing them to ***a list of authorized users***." ERIC-1007, 22:7-13 (emphasis added).

157. **Second**, Golden teaches determining whether to admit a requested connection in a network: "[i]t should be noted that, alternatively or additionally, ECP 50 could communicate with a policy server within the network ***for further determination on whether to admit the connection***." ERIC-1007, 10:9-12 (emphasis added).

158. As would have been recognized by one having ordinary skill in the art, Golden's teaching regarding whether to admit a requested connection by a policy server encompasses a determination on whether the requesting endpoint is authorized to use a quality of service parameter, such as bandwidth or codec as taught in Golden. *See, e.g.,* ERIC-1007, 15:35-39. As would have been further recognized by one having ordinary skill in the art, such a policy server would easily be part of the ECP 50 instead of a separate entity – this would have been an obvious variant to implement and would have been nothing more than the routine application of ordinary skill.

159. **Third,** to the extent that Golden does not explicitly teach that the ECP 50 determines whether the requesting host is authorized to use the amount of bandwidth requested, such a control function would have been well known and obvious to a person having ordinary skill in the art. For example, Fichou teaches a reservation server that verifies reservation requests when received from a source workstation:

> In accordance with the method of the present invention, a reservation request is delivered from the source workstation to a reservation server. The reservation server includes a user database for storing the identification of ***each user allowed to access to the reservation server and also stores the rights of each user***. The reservation server further includes a network database for storing the information describing a network capacity required to set up the virtual connection. ***A verification is then performed to determine whether or not the reservation request may be validated in view of user information within said source workstation***.

ERIC-1008, Abstract (emphasis added).

160. The "reservation request" identified in Fichou includes a bandwidth requested by the source workstation: "***a reservation request message is constructed*** (step 42) ***including the necessary parameters such as*** destination, ***bandwidth***, Quality of Service, type protocol or port number." ERIC-1008, ¶ [0023].

161. Fichou teaches that the reservation server takes the bandwidth requested in the reservation request into consideration when determining whether the user is authorized for the request: "[n]ext, ***a user rights verification (step 52) is***

performed using the same database 50 which defines for each user ***which kind of request he is allowed to perform***. The result of such a verification ***may be in terms of bandwidth required for a call, destination allowed, QoS***, etc." ERIC-1008, ¶ [0025] (emphasis added).

162. As would have been recognized by a person having ordinary skill in the art, a "user rights verification" as in Fichou, which is performed at a reservation server in response to receiving a "reservation request" that includes bandwidth, and which is based on "which kind of request he is allowed to perform" including "bandwidth required, destination allowed, QoS, etc." is a determination of whether the requesting user is authorized for the requested service, which includes bandwidth required.

163. For the reasons to combine Fichou with Golden, please see Section VIII.C above.

164. Thus, Golden's ECP in communication with a policy server, in combination with Fichou's reservation server verifying users' reservation requests based on user rights verification for bandwidth, QoS, etc., teaches "determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the codec" as recited in the claim.

[1.4] ***and whether the terminating end-point can be reached by the controller;***

165. Golden teaches that the controller determines whether the terminating end-point can be reached by the controller: "ECP 50 then processes the request …checking the resources along the path(s) to the requested destination." ERIC-1007, 14:34-37. Golden gives an example of where the controller does determine that the destination endpoint can be reached: "signaling interface process 104 [of the destination endpoint***] receives requests for participation*** in, or termination of, a reserved connection ***from ECP 50*** …". ERIC-1007, 14:2-4 (emphasis added).

166. "If the connection can not be established (e.g., not enough bandwidth available, ***the other participant does not agree to the connection***), ECP 50 notifies host 102 to that effect via signaling channel 58, which message is received by signaling interface process 104." ERIC-1007, 14:34-41 (emphasis added). As would have been recognized by a person having ordinary skill in the art, if the "other participant," the destination party in Golden, does not agree to the connection, then that party cannot be reached as would be determined by the ECP 50 when "attempting to secure the desired service."

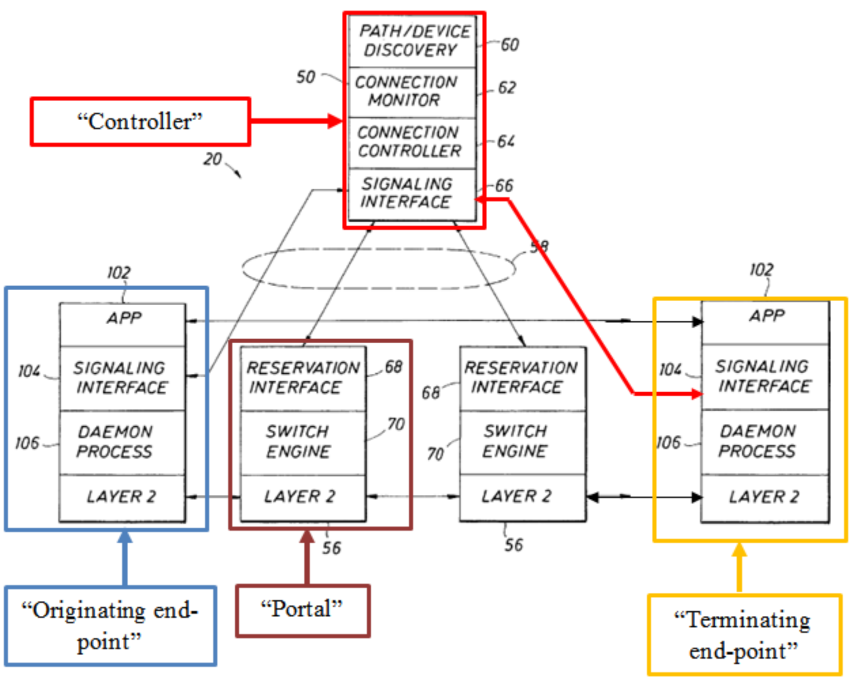
167. In addition to the destination endpoint receiving requests for participation, Golden teaches that the user of the destination endpoint receives the request: "When such requests are received by host 102, daemon process 106 activates user interface process 108, which in turn paints a dialog box on the host's video display, ***querying the user whether to participate in the connection***." ERIC-1007, 15:21-28 (emphasis added).

168. Thus, Golden's other participant agreeing or not agreeing to the connection teaches "and whether the terminating end-point can be reached by the controller" as recited in the claim.

[1.5] ***directing, by the controller, a portal that is positioned in the network and physically separate from the controller to allocate local port resources of the portal for the connection;***

169. Golden teaches directing, by the controller, a portal that is positioned in the network and physically separate from the controller to allocate local port resources of the portal for the connection.

170. **First,** Golden teaches a portal (e.g., switch 56) that is positioned in the network:



ERIC-1007, FIG. 9 (modified and annotated according to Golden's teachings).

171. Golden teaches that the discussion with respect to "switches" applies to “routers” as well: “[i]t should be apparent to those skilled in the art that switches 56 are not necessarily layer 2 forwarding devices; rather, the enhanced functionality present within switches 56 could be applied to application layer forwarding devices and routers in addition to layer 2 forwarding devices. … However, for simplicity, this example of the invention describes only switches 56 within a common network 20.” ERIC-1007, 8:64-9:8.

172. **Second**, Golden teaches that the portal is physically separate from the controller: “***ECP 50 is*** either ***a standalone processor and software that communicates with a switch in network 20 as any other endstation***.” ERIC-1007, 7:63-67 (emphasis added). This is further illustrated in annotated FIG. 9 above (the switches 56 being illustrated as separate from the ECP 50).

173. **Third**, Golden teaches that the switches have port resources, for example more than one port and bandwidth for those ports: “The network elements include endstations such as host 52 and router 54 and switches such as switches 56, as well as the interfaces between them (e.g. ***switch ports***).” ERIC-1007, 8:23-26 (emphasis added). Golden teaches that “bandwidth on a port has been reserved by the ECP” after reservation occurs. ERIC-1007, 11:53-56. A person having ordinary skill in the art would have understood, therefrom, that a port in Golden would have a bandwidth reservable by an ECP.

174. It would have been obvious to a person having ordinary skill in the art to look at the details regarding switches at column 8 (associated with FIG. 5) of Golden, because reference is made in Golden to the switches with the same reference number, 56, in the relevant figures.

175. Fourth, Golden teaches that the ECP directs the switch 56 to allocate local port resources including bandwidth for the connection: "***[ECP 50] then determines the overall capacity of the first available path by determining*** from network elements registry 57 ***whether the minimum bandwidth available through each*** link, switch, and ***switch port in the path*** will be sufficient to fulfill the bandwidth and/or quality of service requested for the connection." ERIC-1007, 9:60-66 (emphasis added).

176. "If an available path can provide the requested service for the connection, connection controller function 64 [of ECP 50] ***sends a bandwidth reservation to each switch 56 in the path via signaling interface function 66 and signaling channel 58***. The reservation includes the source and destination of the connection … and the desired bandwidth in packets per second, for example." ERIC-1007, 10:26-36 (emphasis added). As a result of the above reservation, "***bandwidth on a port*** has been reserved by the ECP" in the switches 56. ERIC-1007, 11:53-54 (emphasis added).

177. A person having ordinary skill in the art would have recognized that, based on the above teachings, the bandwidth reservation to the switches involves allocating local port resources of that switch in Golden. For example, Golden shows that when traffic reaches a switch at which bandwidth on a port has been reserved, any other possible traffic that could consume the resources do not receive preferred access to those resources: "[the switch] only ***gives QOS/COS traffic preferred access to the available bandwidth of a switch or router port***." ERIC-1007, 11:51-53. In other words, the switch in Golden allocates local port resources including at least bandwidth on at least one port in response to a direction from the ECP.

178. Another port resource that Golden teaches are queues: "[t]here are two basic designs for controlled-QOS switching systems: input-queuing and output-queuing." ERIC-1007, 3:7-9. "[I]f the switch 56 maintains ***separate port queues for priority traffic***, enhanced switch engine 70 can forward reserved connection packets to high priority queues, while dropping or forwarding to lower priority queues those packets which contend for access to ports involved in reserved connections." ERIC-1007, 11:57-62.

179. It would have been obvious to a person having ordinary skill in the art that, in Golden's switch having separate queues for different priorities of traffic, the higher priority traffic would be allocated space in higher priority queues. This was a well-known design choice to a person having ordinary skill in the art as a design choice (e.g., whether implemented in software or hardware).

180. Therefore, as explained above, Golden teaches "directing, by the controller, … [a portal] to allocate local port resources of the portal" that includes at least *sending an allocation instruction from the controller to the portal, where the allocation instruction results in the portal allocating physical and/or logical elements of the portal*.

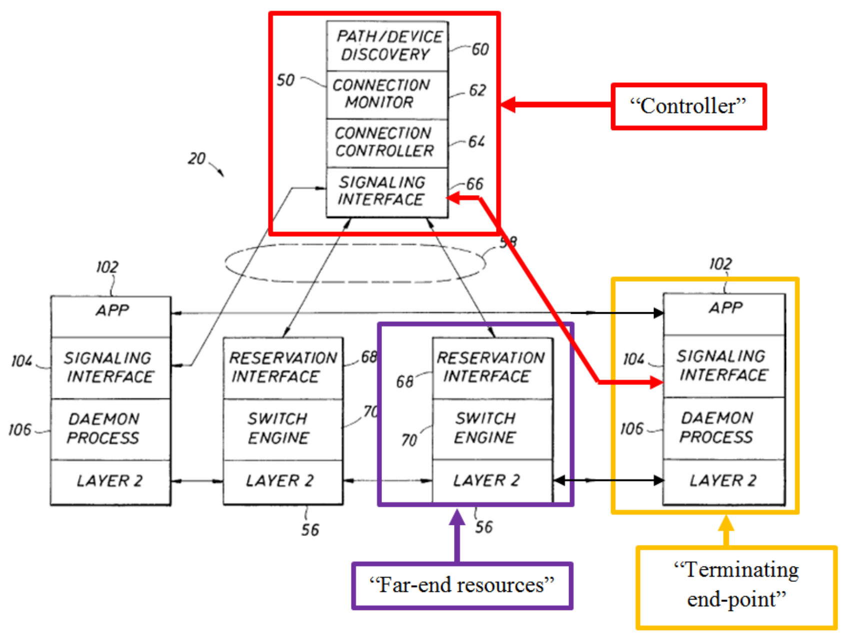
181. Thus, Golden's ECP that determines switch ports in the path, and sends the bandwidth reservation messages to the switches resulting in local port resources (including bandwidth and/or queues) being allocated, teaches "directing, by the controller, a portal that is positioned in the network and physically separate from the controller to allocate local port resources of the portal for the connection" as recited in the claim.

[1.6] *negotiating, by the controller, to reserve far-end resources for the terminating end-point; and*

182. Golden teaches negotiating, by the controller, to reserve far-end resources for the terminating end-point, both to reserve far-end resources near the terminating end-point and on the terminating end-point.

183. **First**, Golden teaches that the ECP attempts to secure the desired service at resources along the path to the destination: "ECP 50 then processes the request similarly as described above by checking the resources along the path(s) to the requested destination and attempting to secure the desired service." ERIC-1007, 14:34-37. In particular, Golden teaches that ECP 50 waits for a response from the switches along the path (including at the far end) before the connection is counted as established: "[c]onnection controller function 64 then waits for an acknowledgment from each switch 56 to which a reservation request was sent." ERIC-1007, 10:37-46.

184. As would have been recognized by a person having ordinary skill in the art, Golden's disclosure of "attempting to secure the desired service" at "resources along the path," including waiting for the switches to respond to a reservation request, teaches negotiating the reservation of resources. Further, because those resources in Golden include switches near the terminating host along the path, i.e. a far-end switch 56 near destination host 102 in FIG. 9 (annotated below), these qualify as "far-end resources for the terminating end-point."



ERIC-1007, FIG. 9 (modified and annotated).

185. Second, Golden teaches that the ECP attempts to secure the desired service (in other words, reserve resources) on the terminating end-point: "[m]eanwhile, for ***connection requests sent to host 102 from another network host***, these are received by daemon process 106 via signaling interface process 104. … When such requests are received by host 102, daemon process 106 activates user interface process 108, which in turn paints a dialog box on the host's video display, querying the user whether to participate in the connection. The answer is collected by user interface process 108 via user I/O devices and relayed to the daemon process 106. Daemon process 106 then formats an answer message which is sent to ECP 50 via signaling interface process 104." ERIC-1007, 15:12-30 (emphasis added).

186. As would be recognized by one having ordinary skill in the art, the connection requests received at a host 102 that result in reserving resources on the receiving host 102 are for the receiving host 102 as part of the connection. Further, it would have been recognized that the host 102 receiving, and responding with whether the request is accepted or not, constitutes an act of negotiation between the ECP 50 (that receives the answer message) and the host 102 (the terminating end-point).

187. Thus, Golden's reserving resources near, and on, the terminating end-point teaches "negotiating, by the controller, to reserve far-end resources for the terminating end-point" as recited in the claim.

[1.7] ***providing, by the controller to the portal, routing instructions for traffic corresponding to the connection so that the traffic is directed by the portal based only on the routing instructions provided by the controller,***

188. Golden in combination with Lee teaches providing, by the controller to the portal, routing instructions for traffic corresponding to the connection so that the traffic is directed by the portal based only on the routing instructions provided by the controller.

189. **First,** the ECP provides reservation requests to the portal (switch 56): "[f]ocusing more particularly on the operation of switches 56 illustrated in FIG. 6 according to the invention, as described above, reservation interface function 68 of each ***switch 56 receives bandwidth reservation requests from ECP 50 via reserved signaling channel 58***. … Upon receipt of such a request, reservation interface function 68 stores the addresses and desired bandwidth in connection pairs list 67 and sends an acknowledgment to ECP 50." ERIC-1007, 11:8-24 (emphasis added). "***The reservation includes the source and destination of the connection***." ERIC-1007, 10:31-36 (emphasis added).

190. Thus, a person having ordinary skill in the art would have appreciated that the ECP in Golden performs centralized control functions relating to bandwidth reservation, as well as provides the results of those control functions in the form of instructions to the switches in the determined path (for a reserved connection), and that the instructions affect the treatment of packets received at the recipient switches.

191. Further, Golden states that the contents of then co-pending U.S. Patent Application No. 09/060,520 ("the '520 application") were incorporated by reference. *See* ERIC-1007, 5:1-6. In the '520 application, it teaches that a switch can be modified: "[i]t should be noted that virtual circuit connections can be reserved based not only on the MAC addresses of the participating endstations, but also on layer 3 addresses such as IP addresses, or even protocols, thus ***permitting the adapted switches in the network to discriminate between network traffic*** attributable to different processes on the same machine." ERIC-1013, p. 23 (emphasis added).

192. A person having ordinary skill in the art would have appreciated from this statement that an ECP, which according to Golden can decide from multiple paths to reserve an end-to-end connection, would provide updates to the switching table in a modified switch in order to enable the switch to "discriminate between network traffic" as stated in the '520 application. This is because, in order to be able to discriminate between different processes on the same machine, changes to the switching table would have to be made where different routes are reserved for different processes.

193. **Second**, to the extent that Golden does not explicitly state that the instructions are provided to the switches by the central ECP, it would have been obvious to a person having ordinary skill in the art that the instructions would be sent to the switch to enable discrimination between processes, and assume a variety of formats, depending upon the particular protocols/hardware/software implemented at the switches 56 in Golden.

194. Golden expressly teaches that the switches and routers taught therein "can be applied to internetwork signaling protocols other than RSVP," but focused on RSVP for clarity of discussion. ERIC-1007, 8:1-3. Golden continued: "other protocols have been or are in the process of being developed to improve and provide differentiated classes of service (COS) between networks." ERIC-1007, 2:22-24.

195. Multiprotocol Label Switching (MPLS) is an example protocol that Golden teaches. Golden continues with respect to MPLS: "Multiprotocol Label Switching (MPLS) is a scheme in which labels are associated with streams of packets between communicating hosts. ***These labels are used by MPLS-capable routers in the path between the hosts to cause all packets in the stream to be forwarded the same way. This further allows hosts to use predetermined explicit routing***." ERIC-1007, 2:26-31.

196. Further, Golden teaches that a person having ordinary skill in the art would be able to implement the switches as MPLS switches: "Path/device discovery function 60 learns what network elements and paths between endstations exist within the LAN and maintains respective lists of each in network elements registry 57 and path list 59. ***The network elements include*** endstations such as host 52 and router 54 and ***switches such as switches 56***, as well as the interfaces between them (e.g. switch ports)." ERIC-1007, 8:20-26 (emphasis added).

197. Golden continues with respect to controllable network elements: "[t]he controllable network elements 120 can be devices such as … IP switches and routers, QOS routers, Layer 2 switches …" ERIC-1007, 16:19-29. According to Golden, one or more "network elements" (which can include switches 56 illustrated in FIG. 9 and the other figures of Golden) are able to support MPLS. *See* ERIC-1007, 20:34-41.

198. **Accordingly**, it would have been obvious to a person having ordinary skill in the art reading Golden that the switches 56 may be network elements supporting MPLS (or, in other words, MPLS switches). To the extent that Golden does not explicitly state how the ECP 50 would interact with one or more switches 56 that are MPLS switches, including the particular types of instructions the ECP 50 can provide from its control functions, Lee teaches such details.

199. For example, Lee teaches that a "centralized control apparatus" managing an MPLS network with "at least one label switching network element" provides instructions "for controlling and managing the MPLS network." ERIC-

1009, ¶¶ [0016], [0017], [0033]. To that end, Lee teaches first that the centralized control apparatus, which it also calls a centralized control system, performs label switched path (LSP) computations on behalf of the MPLS switches in the MPLS network. *See* ERIC-1009, ¶ [0034].

200. Lee teaches that, after the centralized control system calculates the LSP through the network, "[t]he LSP calculated by the LSP computation section 302 [of the centralized control system] ***is set [sic] to the respective MPLS switches*** via an LSP activation section 304." ERIC-1009, ¶ [0057] (emphasis added). Lee teaches a transmission of information to the MPLS switches: "***the information transmitted to the respective MPLS switches is*** Forward Equivalence Classes (FEC) information, lower class level interface topology information, class to EXP mapping information, ***Label Forwarding Information Base (LFIB) information*** and so on." ERIC-1009, ¶ [0057] (emphasis added).

201. This "LFIB," as would have been recognized by a person having ordinary skill in the art, is used by a switch set thereby for lookups when a labeled packet is received instead of an IP lookup in a traditional routing table. Indeed, Lee teaches that the LFIB "is the MPLS label switching information that the respective MPLS switches should proceed and which can include an input label, an output label, an output interface and so on." ERIC-1009, ¶ [0058]. Thus, the "LFIB" taught in Lee constitutes "routing instructions" as used in this claim.

202. For the reasons to combine Lee with Golden, please see Section VIII.E above.

203. **Third,** traffic that qualifies under the reservation request (i.e., "traffic corresponding to the connection" as recited in claim element [1.7]), as taught by Golden, is directed by the switch based only on the LFIB information as taught by Lee: "LFIB information ***is the MPLS label switching information that the respective MPLS switches should proceed*** and which can include an input label, an output label, an output interface and so on." ERIC-1009, ¶ [0058] (emphasis added). As would have been recognized by a person having ordinary skill in the art, MPLS switches use the LFIB information instead of a local routing table when a labeled packet is received on one of their ports. Therefore, labeled packets are routed only based on the routing determined by the centralized control point taught by Golden in combination with Lee.

204. Thus, Golden's ECP providing instructions (e.g., bandwidth reservation requests) to the switches (including MPLS switches), in combination with Lee's teachings of specific types of routing instructions as pertains to MPLS switches, and the traffic being directed by the information in the incoming packet according to the routing instructions, teaches "providing, by the controller to the portal, routing instructions for traffic corresponding to the connection so that the traffic is directed by the portal based only on the routing instructions provided by the controller" as recited in the claim.

[1.8] ***wherein the portal does not perform any independent routing on the traffic,***

205. Golden in combination with Lee teaches wherein the portal does not perform any independent routing on the traffic.

206. In particular, Golden's MPLS switch (the claimed "portal") taught as a possible type of switch used in the network of Golden, in combination with Lee's MPLS routing instruction teachings, does not perform any independent routing on the traffic associated with the reserved connection (e.g., labeled packets for the LSP taught as determined by a centralized control system in Lee): "LFIB information ***is the MPLS label switching information that the respective MPLS switches should proceed*** and which can include an input label, an output label, an output interface and so on." ERIC-1009, ¶ [0058] (emphasis added).

207. As would have been recognized by a person having ordinary skill in the art, MPLS switches use the LFIB instead of a routing table when a labeled packet is received on one of their ports. In other words, the MPLS switches in Lee do not perform independent routing on labeled packets when there is an LFIB received from a centralized control system that pertains to the labeled packets.

208. Thus, Golden's switches (e.g., MPLS switches) in combination with Lee's teachings of an LFIB transmitted from a centralized controller for routing instead of traditional routing tables, teaches "wherein the portal does not perform any independent routing on the traffic" as recited in the claim.

[1.9] ***and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller,***

209. Golden teaches wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller.

210. **First**, Golden teaches that the connection from originating end-point to terminating end-point is provided by a dedicated bearer path: "[t]he enterprise control point identifies a path within the network that can satisfy the requested QOS/COS and ***reserves the requested resources all along the path from beginning to end***." ERIC-1007, 5:47-50 (emphasis added).

211. **Second,** Golden teaches that the path that is end-to-end is reserved (dedicated) for the traffic, including a required route via Lee's labeled packets: "The message from ECP 50 notifying host 102 ***that the connection can be established*** also includes the "user_priority" or selected queue that host 102 should use in the IEEE 802.1P/Q frame header of all packets corresponding to that connection. At the time ***the connection is established*** …" ERIC-1007, 14:63-15:1 (emphasis added). "Connection controller function 64 reduces the bandwidth available through each link, switch, and switch port in the path, and thus the overall capacity of the path, ***in accordance with bandwidth consumed by currently existing connections listed in its current connection list 63***." ERIC-1007, 9:66-10:3 (emphasis added). "If an available path can provide the requested service for the connection, ***connection controller function 64 sends a bandwidth reservation to each switch 56 in the path*** via signaling interface function 66 and signaling channel 58." ERIC-1007, 10:26-29 (emphasis added). The "available path" in Golden is a dedicated bearer path in response to the ECP sending bandwidth reservations to each switch in the path – it is reserved to bear the traffic for the requested service.

212. Third, Golden teaches that the dedicated bearer path includes a route that is supported by the portal. Golden teaches that the bandwidth reservation requests result in a path being reserved through the switch, since the reservation is sent to the switches in the path determined by the ECP: "reservation interface function 68 of each switch 56 ***receives bandwidth reservation requests from ECP 50 via reserved signaling channel 58***." ERIC-1007, 11:8-24 (emphasis added). Thus, because Golden teaches that the path is determined end-to-end, and the particular switch in the path (this switch being the "portal") receives the reservation for its part of the path (including labels as taught in combination with Lee), Golden teaches that the part of the path through the portal is a required route supported by the portal.

213. Fourth, Golden teaches that the route is dynamically provisioned by the controller: "[i]f an available path can provide the requested service for the connection, ***connection controller function 64 sends a bandwidth reservation to each switch 56 in the path*** via signaling interface function 66 and signaling channel 58." ERIC-1007, 10:26-29. In particular, because each switch in the path receives reservation commands from the ECP, each switch (including the portal) dynamically provisions its route that is part of the end-to-end path.

214. Fifth, Golden teaches that the connection itself is dynamically provisioned by the controller: "[t]he present invention relates to a method and apparatus for providing guaranteed quality and/or class of service (QOS/COS) in a local or wide area network or across networks, and more particularly, to a technique for adapting an existing packet-switched/routed infrastructure ***so that on-demand reserved- bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks can be established***." ERIC-1007, 1:11-21 (emphasis added).

215. Golden explicitly details how the connections are "on-demand" by describing the establishing of the reservations all along the path from end to end for connections in response to a request (*see, e.g.*, ERIC-1007, 10:27-30), as well as tearing down connections when they are done. The ECP 50: "finds the connection in its current connection list, deletes the connection and updates the list, notifies the connection monitor function 62 that the connection is ending, and sends bandwidth release messages to each switch 56 involved in the connection." ERIC-1007, 11:14-24.

216. Thus, Golden's identified path from beginning to end that is reserved for traffic, where the identified path is reserved (provisioned) by the ECP on demand and supported by the portal, teaches "and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller" as recited in the claim.

[1.10] ***and wherein control paths for the connection are supported only between each of the originating and terminating end-points and the controller and between the portal and the controller.***

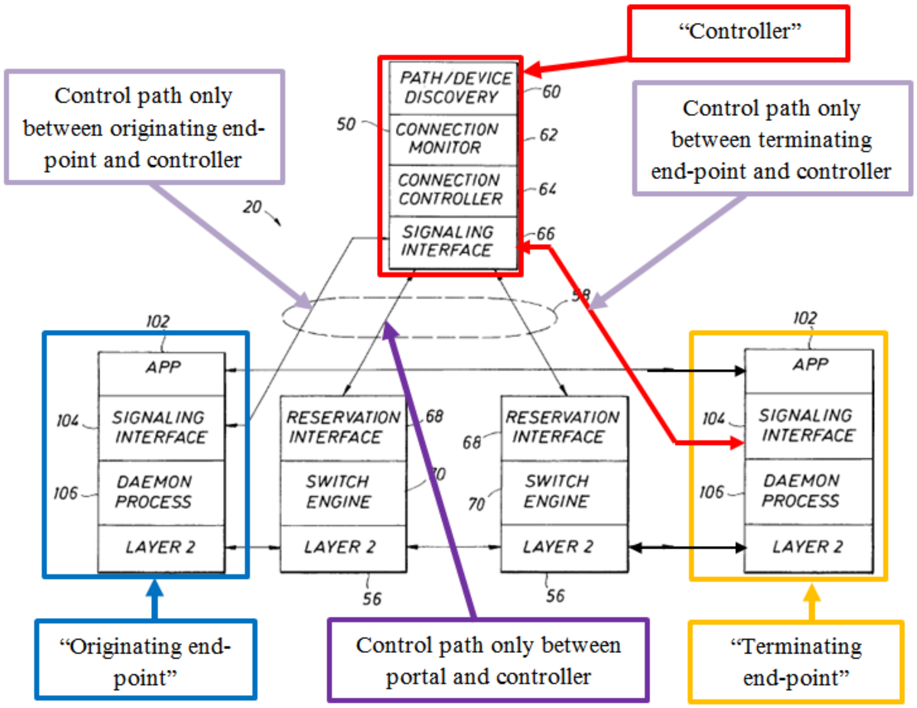
217. Golden teaches wherein control paths for the connection are supported only between each of the originating and terminating end-points and the controller and between the portal and the controller.

218. **First**, the control paths for the connection are supported only between each of the end-points and the controller: "[i]n accordance with requested connections processed by daemon process 106, signaling interface 104 sends connect/disconnect messages to ECP 50 ***via reserved signaling channel 58***." ERIC-1007, 13:34-37 (emphasis added). Golden teaches that a "host" has the direct signaling path.

219. Golden further teaches that the terminating end-point is a host with a similar dedicated path: "[a]lthough FIG. 9 illustrates an example where host 102 is communicating with a conventional host/router 94, it should be apparent that host 102 can also ***communicate with other hosts similarly upgraded as host 102***." ERIC-1007, 14:37-40 (emphasis added).With the terminating end-point an upgraded host 102 as well, "[s]ignaling interface process 104 [of the terminating end-point] receives requests for participation in, or termination of, a reserved connection from ECP 50 via signaling channel 58." ERIC-1007, 14:2-4.

220. **Second,** the control paths for the connection are supported only between the portal and the controller: "[m]oreover, switches 56 include additional functionality in the form of reservation interface function 68 that communicates with ECP 50 via reserved signaling channel 58 to exchange information about reserved connections." ERIC-1007, 9:53-57. "As the functionality of ECP 50 is shown in more detail in FIG. 5, signaling interface function 66 provides the ability to communicate with switches 56 via a reserved signaling channel 58 …" Golden, 8:16-19.

221. Both of the above concepts are illustrated in FIG. 9 below:



ERIC-1007, FIG. 9 (modified and annotated).

222. Thus, Golden's reserved signaling channels between the ECP and the switches, and between the ECP and the end points, teach "wherein control paths for the connection are supported only between each of the originating and terminating end-points and the controller and between the portal and the controller" as recited in the claim.

2. <u>Dependent Claim 2</u>

[2.0] ***The method of claim 1***

223. See the analysis of claim elements [1.0] through [1.10] above.

[2.1] ***wherein the controller is associated with a single class of service and wherein a service type of the request identifies the request as being of the single class of service and the request is routed to the controller based on the service type.***

224. Golden teaches that the controller is associated with a single class of service and wherein a service type of the request identifies the request as being of the single class of service and the request is routed to the controller based on the service type.

225. First, Golden teaches embodiments where traffic is routed to the controller (ECP) based on the service type (class of service) of the request. ERIC-1007, 5:55-56; 12:28-67. The ’119 Patent refers to the “IEEE 802.1p bit marking to differentiate the service classes, and route traffic accordingly.” ERIC-1001, 3:5-6. Golden similarly teaches using IEEE 802.1P/Q and that, when packets using IEEE 802.1P/Q are detected, “forwarding [the] detected packets to an enterprise control point for processing via a reserved signaling channel.” ERIC-1007, 5:55-56. Therefore, the ECP in Golden is associated with at least one class of service of the reserved connection.

226. Second, Golden teaches that the IEEE 802.1P/Q priority level (class of service) in a packet identifies the request as being of the single class of service. When using IEEE 802.1P/Q, a packet header in Golden includes “the desired class of service or priority level.” ERIC-1007, 12:44-46. As a result, the IEEE 802.1P/Q header information including desired class of service or priority level identifies the packet as being of the “single class of service.”

227. Third, Golden teaches that requests are routed to the controller based on the service type. The IEEE 802.1P/Q priority level (class of service) in a packet (service type of the request) of a new flow is an “implicit reservation” (a request for a reserved connection with certain QoS parameters). ERIC-1007, 12:21-24. The packet including the desired priority level is routed to the ECP based on this “implicit reservation” in the packet header. *Id.*.

228. Specifically, when packets are sent, “[i]ntermediate switches 56 detect packets using the extended frame header format of IEEE 802.1P/Q and compare the header information within such packets to information regarding current reserved connections in the switch's connection pairs list 67.” ERIC-1007, 12:40-44. Based on the comparison, “[i]f the header information does not match, the header information is forwarded to ECP 50 via the reserved signaling channel.” *Id.*, 12:50-52. This mismatch identifies the packet as part of a new flow, which Golden identifies as the “implicit reservation.” Golden’s priority level (service type) causes the packet with a new flow to be routed to the controller (ECP) based on the service type.

229. To the extent that Golden does not explicitly state that the routing of new flows based on the “desired priority level within the packet” is based on a “single” priority level, a POSITA would have known that routing decisions are based on any number or variety of criteria and are generally programmable and flexible. A POSITA would have known to implement Golden’s “desired priority level" in a programmable way to include any one or more priority levels.

230. Thus, Golden's hosts 102 that request reserved connections, and do so by specifying a kind of connection desired, which is then sent to the ECP 50, teaches "wherein the controller is associated with a single class of service and wherein a service type of the request identifies the request as being of the single class of service and the request is routed to the controller based on the service type" as recited in the claim.

3. Dependent Claim 3

[3.0] ***The method of claim 1***

231. See the analysis of claim elements [1.0] through [1.10] above.

[3.1] ***wherein the request is received by the controller based on signaling from a user to the controller.***

232. Golden teaches that the request is received by the controller based on signaling from a user to the controller.

233. **First**, Golden teaches that the reservation requests are from a user: "[t]hat is, in this embodiment, host 102 includes a daemon process 106 that processes ***user requests for reserved connections*** with other hosts within the network or in other networks." ERIC-1007, 13:31-34 (emphasis added).

234. **Second**, Golden teaches that the request is received by the controller based on signaling from the user's device: "[i]n accordance with requested connections processed by daemon process 106, ***signaling interface 104 sends***

connect/disconnect messages to ECP 50 via reserved signaling channel 58." ERIC-1007, 13:34-37 (emphasis added).

235. Thus, Golden's daemon process at a host that processes user requests and which sends connect/disconnect messages to the ECP via a signaling channel teaches "wherein the request is received by the controller based on signaling from a user to the controller" as recited in the claim.

4. Dependent Claim 4

[4.0] ***The method of claim 3***

236. See analysis of claim elements [1.0] through [1.10] and claim elements [3.0] through [3.1].

[4.1] ***wherein the request is received from the user via one of a directory request, an Internet Protocol address, and a web page.***

237. Golden teaches that the request is received from the user via one of a directory request, an Internet Protocol address, and a web page.

238. Golden teaches that a user uses a browser to request a reserved connection: "[t]o enable ***browser 112*** to handle URLs unique to the reserved connection services of the present invention, browser 112 is configured with plug-in application 110, whose main function is to notify daemon process 106 ***when a reserved connection is being requested from the browser***." ERIC-1007, 13:64-14:1 (emphasis added).

239. Golden continues that the user makes a selection in the browser (a web page):

> [f]or example, when a user is running ***browser 112*** and desires to originate a reserved connection, ***a web page that contains a directory of users is accessed*** and ***the directory is displayed in the browser window***. The directory contains a list of users, whose names are preferably shown as hypertext with links having URLs that are unique to the reserved connection services of the present invention. ***When the user selects a party or parties from the list, browser 112 invokes plug-in application 110 to handle the request, and plug-in application 110 in turn notifies daemon process 106***. Daemon process 106 invokes user interface process 108, which draws a dialog box on the host's display asking the user to specify what kind of connection is desired (e.g., audio only, data only, teleconference, etc.). ***This information is returned to daemon process 106 and formatted into a connection request that is forwarded to signaling interface 104, which sends the request to ECP 50***.

ERIC-1007, 14:17-33 (emphasis added).

240. Thus, Golden's request coming from a web page accessed via a browser, and selection from a list in a directory displayed in the browser, teaches "wherein the request is received from the user via one of a directory request, an Internet Protocol address, and a web page" as recited in the claim.

5. Dependent Claim 5

[5.0] ***The method of claim 1 further comprising:***

241. See the analysis of claim elements [1.0] through [1.10] above.

[5.1] ***identifying, by the controller, billing information of a user corresponding to the request for a high quality of service connection; and***

242. The combination of Golden and Fichou teaches identifying, by the controller, billing information of a user corresponding to the request for a high quality of service connection.

243. **First**, Golden teaches the tracking, and therefore identifying, of billing information for a QoS reserved connection: "the functionality of ECP 50 is shown in more detail in FIG. 5 … [including] [c]onnection monitor function 62 [that] ***maintains a permanent list of connections***, including respective permanent connection records 65 that show the elapsed time of the connection, the parties involved, and the resources used. ***Such records can be used for billing and resource management***, for example." ERIC-1007, 8:16-39 (emphasis added).

244. This "permanent list of connections" is with respect to "reserved connections" for desired QoS, and therefore Golden teaches that the ECP identifies, by its tracking, information for billing that correspond to the respective reserved connections it sets up and tears down. One of the records includes "the parties involved," which a person having ordinary skill in the art would have recognized would include the "user corresponding to the request for a high quality of service connection."

245. **Second**, to the extent that Golden does not explicitly state that the "parties involved" includes the "user" as claimed (though such would have been obvious to a person having ordinary skill in the art as noted above), Fichou teaches a reservation server that maintains a "user database" of "each user allowed to access the reservation server and [that] also stores the rights of each user." ERIC-1008, Abstract. Further, Fichou teaches similar reservation accounting: "In addition, the reservation server is informed that a first packet of a new flow has been received and processed which will start a connection timer for this flow for accounting of the use of this reservation." ERIC-1008, ¶ [0037]. The combination of Golden and Fichou therefore teaches the tracking of billing on a per-user basis with respect to high QoS connections set up by the ECP in Golden.

246. Finally, Golden further teaches a "billing management component 182" associated with a "network control system server" (NCSS) that "collects and formats the information recorded" for use with "standard billing information formats." ERIC-1007, 17:51-55. It would have been obvious to a person having ordinary skill in the art that Golden's teaching of "standard billing information formats" would include user database information about how to bill the users for the requested connections, i.e. format and contact information for the users. This was a well-known option. Golden taught tracking information for billing and resource management, as well as the formatting of bills.

247. The NCSS controls "controllable network elements" between LANs, which control functions are integratable with an existing ECP. ERIC-1007, 17:26-43. This would be a combination of known elements (e.g., the ECP and the NCSS functions) according to known methods (e.g., integrating to a given server) to achieve the predictable result of the functionality incorporated into a single server (e.g., network elements control and use billing).

248. Thus, Golden's ECP maintaining records for billing with respect to reserved connections, that includes parties to the connection, combined with Fichou's teaching regarding keeping database records on a per-user basis, teaches "identifying, by the controller, billing information of a user corresponding to the request for a high quality of service connection" as recited in the claim.

[5.2] ***charging the user for the connection.***

249. The combination of Golden and Fichou teaches charging the user for the connection.

250. Golden teaches use of a billing management component that collects billing information for use in billing: "[b]illing management component 182 has access to disk array 177 via low speed network 178. It collects and formats the information recorded therein for output and ***use according to de-facto standard billing information formats used throughout the telecommunications industry***." ERIC-1007, 17:51-55. As would have been recognized by a person having ordinary skill in the art, after billing information has been formatted for output, "use" as stated would include providing the bill (i.e., charging) to the customer for payment. This was well known.

251. It would have been obvious to a person having ordinary skill in the art to combine the teachings of Golden about billing information and billing with the teachings of communications within a single network, as with respect to FIGs. 9 and 10. As Golden recognizes, the different embodiments of Golden can be modified and substituted. *See* ERIC-1007, 24:12-16. Further, a person having ordinary skill in the art would have recognized that operators of even a single local area network would still have interest and need to bill customers in some manner for using their services offered. This is a well-known option as Golden acknowledges.

252. In particular, the NCSS [network control system server] is described in Golden as an entity that, among other things, aids in establishing connections in a network 26 between the endstations, including reserving the path through the network 26. *See* ERIC-1007, 17:26-43. Thus, the functions performed by the NCSS in Golden for network elements between multiple LANs are expressly contemplated for "controllable network elements within an interconnection path between the local area networks," and such elements are integratable with an existing ECP. Indeed, doing so would be nothing more than the combination of known elements (e.g., ECP and the functions of the NCSS) according to known methods (e.g., for integrating functionality and/or hardware into a given server) to achieve the predictable result of the functionality being incorporated into a single server (e.g., an ECP in a local area network for controlling the network elements, i.e. switches, within the local area network and billing for their use).

253. As would have been recognized by a person having ordinary skill in the art, Golden's statement with respect to using the billing information relies upon "de-facto standard billing information formats" which would include actually billing, such as by providing the formatted bills to, the users requesting the high QoS connections in Golden, according to the teachings of user-based database management in Fichou. *See* ERIC-1007, 17:51-55.

254. For example, Fichou teaches that the reservation server's user database tracks "each user," including with respect to what it refers to as "accounting": "[i]n addition, the reservation server is informed that a first packet of a new flow has been received and processed which will start a connection timer for this flow for accounting of the use of this reservation." ERIC-1008, ¶ [0037]. A person having ordinary skill in the art would have appreciated that this "accounting" per user taught by Fichou, in view of Golden's teachings regarding billing for reserved connections, would include actually conveying the bill produced as per Golden.

255. Thus, Golden's billing management component collecting and formatting recorded connection information for billing in combination with Fichou's accounting and per-user tracking, teaches "charging the user for the connection" as recited.

6. <u>Dependent Claim 6</u>

[6.0] ***The method of claim 5***

256. See the analysis of claim elements [1.0] through [1.10] and claim elements [5.0] through [5.2].

[6.1] ***wherein the charging may be based on at least one of a service type, an elapsed period of time, a codec type, and an amount of bandwidth used.***

257. The combination of Golden and Fichou teaches wherein the charging may be based on at least one of a service type, an elapsed period of time, a codec type, and an amount of bandwidth used.

258. Golden teaches billing based on at least an elapsed period of time and an amount of bandwidth used: "the functionality of ECP 50 is shown in more detail in FIG. 5 … [including] [c]onnection monitor function 62 [that] maintains a permanent list of connections, including respective permanent connection records 65 that show ***the elapsed time of the connection***, the parties involved, and ***the resources used. Such records can be used for billing and resource management***, for example." ERIC-1007, 8:16-39 (emphasis added).

259. Golden therefore teaches at least billing based on "the elapsed time of the connection" and "the resources used," which as Golden makes clear includes bandwidth. *See, e.g.*, ERIC-1007, Abstract ("A method and apparatus provide reserved bandwidth and QOS/COS virtual circuit connections in a network using both conventional and novel reservation protocols and frame formats.").

260. Since the claim recites that the charging "may be based on ***at least one of***" the categories listed, and Golden teaches at least two of those categories, Golden teaches "wherein the charging may be based on at least one of a service type, an elapsed period of time, a codec type, and an amount of bandwidth used" as recited in the claim.

7. <u>Dependent Claim 7</u>

[7.0] ***The method of claim 1***

261. See the analysis of claim elements [1.0] through [1.10].

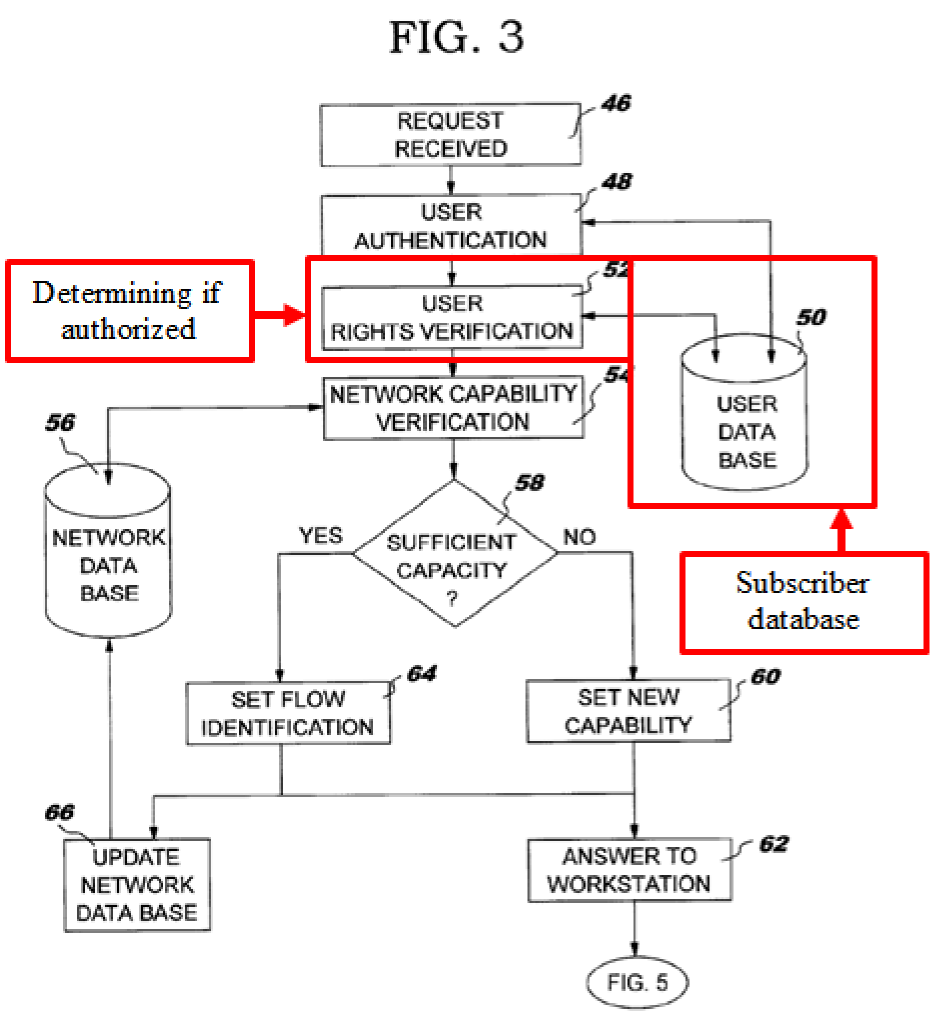
[7.1] ***wherein determining whether the originating end-point is authorized is based on information in a subscriber database.***

262. The combination of Golden and Fichou teaches wherein determining whether the originating end-point is authorized is based on information in a subscriber database.

263. **First**, Golden teaches authorization with respect to use of a network. *See* claim element [1.3]. Further, Fichou teaches that the authorization is for an amount of bandwidth requested: the "reservation request" identified in Fichou includes a bandwidth requested by the source workstation: "[w]hen a user of source workstation 10 needs a new reservation (step 40), which may either be a manual reservation or a reservation requested by an upper-level application, ***a reservation request message is constructed*** (step 42) ***including the necessary parameters such as*** destination, ***bandwidth***, Quality of Service, type protocol or port number." ERIC-1008, ¶ [0023] (emphasis added).

264. **Second**, Fichou teaches that the user verification (the authorizing of the originating end-point) is based on information in a subscriber database: "[n]ext, ***a user rights verification (step 52) is performed using the same database 50*** which defines for each user which kind of request he is allowed to perform." ERIC-1008, ¶ [0025] (emphasis added).

265. The "database 50" referenced here in Fichou is a database that stores "the identification of each user and the user/customer profile when the user of the source workstation is one of multiple users associated with a customer of the server" and "which defines for each user which kind of request he is allowed to perform." ERIC-1008, ¶¶ [0024], [0025]. This "user database 50" of Fichou is illustrated in FIG. 3:



ERIC-1008, FIG. 3 (annotated).

266. A person having ordinary skill in the art would have recognized, from the illustration in FIG. 3 together with the description in Fichou's specification that, as part of "user rights verification," the "user database 50" is checked.

267. Thus, the combination of Golden's ECP and policy server and Fichou's reservation server checking a user database for user rights verification teaches "wherein determining whether the originating end-point is authorized is based on information in a subscriber database" as recited in the claim.

8. Dependent Claim 8

[8.0] *The method of claim 1*

268. See the analysis of claim elements [1.0] through [1.10].

[8.1] *wherein the negotiating, by the controller, to reserve far-end resources on the terminating end-point includes negotiating with another controller associated with the terminating end-point.*

269. Golden teaches that the negotiating, by the controller, to reserve far-end resources on the terminating end-point includes negotiating with another controller associated with the terminating end-point.

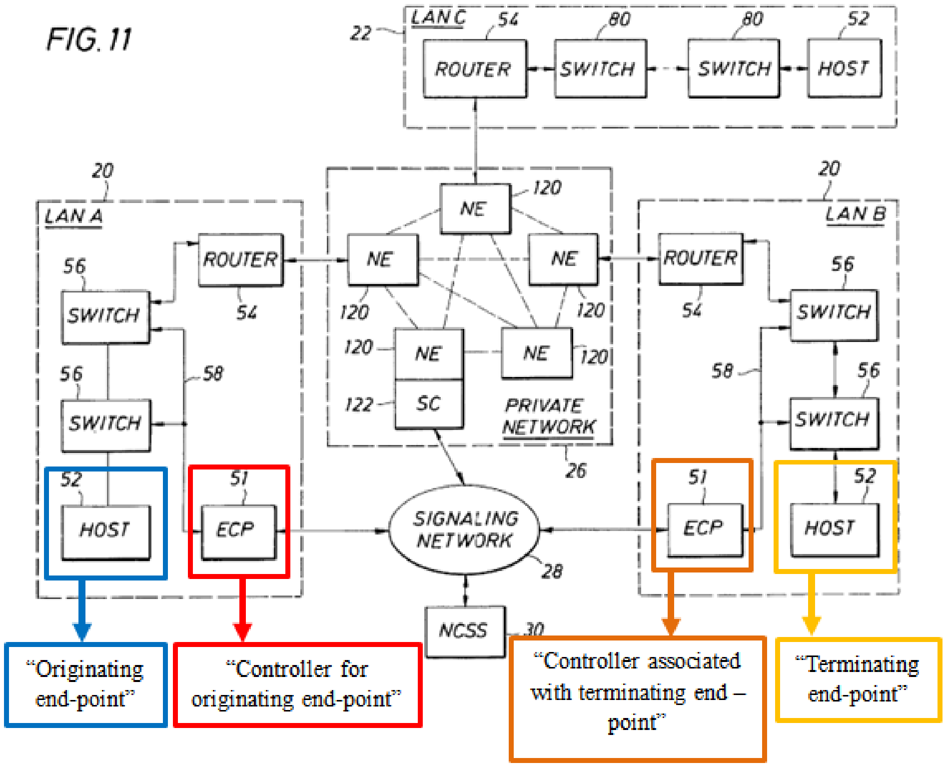
270. First, as shown with respect to [1.6] above, Golden teaches reserving far-end resources on the terminating endpoint. *See* element [1.6].

271. Second, Golden teaches multiple embodiments of its invention. One embodiment provides for achieving an end-to-end high QoS connection in a single local area network (e.g., network 20 of FIG. 9 in Golden). *See, e.g.*, ERIC-1007, 15:14-21. Golden also teaches another embodiment where the requested (and reserved) connection spans across multiple networks: "[t]hat is, in this embodiment, host 102 includes a daemon process 106 that processes user requests for reserved connections with other hosts within the network ***or in other networks***." ERIC-1007, 13:30-33 (emphasis added). "Further advantages are achieved when the principles of the invention are ***extended to inter-network reserved connections*** in addition to reserved connections within a local network."

ERIC-1007, 15:60-63 (emphasis added).

272. Third, in such alternative embodiments, the ECP in the originating host's network still receives a request for a high QoS connection as laid out above with respect to claim elements [1.0]-[1.10]. This ECP is identified as ECP 51 in LAN 20 (LAN A) of FIG. 11, for example. The terminating host may be located in a different network, such as LAN 20 (LAN B) of FIG. 11, with another ECP 51 to administer LAN B.

273. As messages requesting service reach another network, the message is intercepted in that next network and sent on to the local ECP for path determination (and Resv messages destined for the originator of the request in answer to the Path message requests) in that local network: "Switches 56 in LANs A and B trap RSVP ***Path and Resv messages*** destined outside their networks (as well as IEEE 802.1P/Q packets, and packets associated with other reservation protocols) and inform the respective ECP 51 via the respective signaling channel 58. ***ECP 51 processes the information and reserves resources for the connection within the local network*** as described above, and also notifies network control system server (NCSS) 30 via signaling network 28." ERIC-1007, 16:2-10 (emphasis added). This is identified in annotated FIG. 11 of Golden below.



ERIC-1007, FIG. 11 (annotated).

274. Thus, the ECP in the local network where the originating host requests the connection (e.g., ECP 51 in LAN A from originating host 52) notifies the ECP in the far end network (e.g., ECP 51 in LAN B associated with terminating host 52) for reserving resources in the far end network associated with the terminating host. The terminating end-point (host 52 in LAN B of this example) provides a Resv message in response, which is likewise trapped and sent to the ECP 51 of LAN B to reserve those resources. As would have been understood by a person having ordinary skill in the art, that Resv message would have been sent further upstream (i.e., back to LAN A), where the Resv message would be trapped again and sent to ECP 51 in LAN A) to finish the reservation. This notifying/communicating between the two ECPs (e.g., via the NCSS 30 with the signaling path via signaling network 28 illustrated in FIG. 11 above) is an act of negotiation between the controllers (i.e., an offer from the first ECP to the second ECP, with an answer in the form of the Resv message), since Resv messages can include either an acceptance of a reservation or denial (i.e., an error message due to lack of required resources). *See* ERIC-1007, 2:4-7.

275. When looking at the embodiment of Golden associated with FIG. 11, it would have been obvious to a person having ordinary skill in the art that the control path between the terminating end-point would have been from the ECP 51 in LAN A, through the signaling network 28 to the ECP 51 in LAN B and via a signaling channel to the terminating host 52 (which can be a modified host 102 as taught with respect to Golden's FIG. 9). Further, the ECP 51 in LAN A, according to this embodiment of Golden, would forward on connection requests to reach the terminating host in LAN B to carry out the determinations as taught elsewhere in Golden (e.g., painting a dialog box put onto the terminating host's display, collecting the answer, etc.). *See* ERIC-1007, 15:12-30.

276. It would have been obvious to a person having ordinary skill in the art to combine the teachings of Golden with respect to FIGs. 9 and 10, where the hosts 102 communicate directly with an enhanced ECP in a network, with the teachings of Golden with respect to FIG. 11, where enhanced ECPs of multiple networks communicate together. As Golden teaches, "[t]he present invention relates to a method and apparatus for providing guaranteed quality and/or class of service (QOS/COS) in a local or wide area network ***or across networks*** … so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS ***between any endstations*** within the network ***or between networks*** can be established." ERIC-1007, 1:11-18 (emphasis added).

277. Golden expressly contemplated that the embodiments, including that disclosed in FIG. 9 within a given local network, may be combined between different local networks: "an apparatus according to the invention further includes ***a network control system server coupled to different local area networks and also coupled to controllable network elements within an interconnection path between the local area networks***." ERIC-1007, 5:60-6:4 (emphasis added).

278. Indeed, with respect to FIG. 9 specifically, Golden teaches that "host 102 includes a daemon process 106 that processes user requests for reserved connections with other hosts within the network ***or in other networks***." ERIC-1007, 13:31-34 (emphasis added). Thus, a person having ordinary skill in the art, reading this teaching in Golden, would have looked to the other teachings in Golden with respect to "other networks," including the multiple networks and their interaction taught in FIG. 11 and the corresponding description.

279. Thus, the combination of Golden's teachings regarding operations within a local area network with Golden's teachings regarding reservations across networks teaches "wherein the negotiating, by the controller, to reserve far-end resources on the terminating end-point includes negotiating with another controller associated with the terminating end-point" as recited in the claim.

9. Dependent Claim 9

[9.0] ***The method of claim 1***

280. See the analysis of claim elements [1.0] through [1.10].

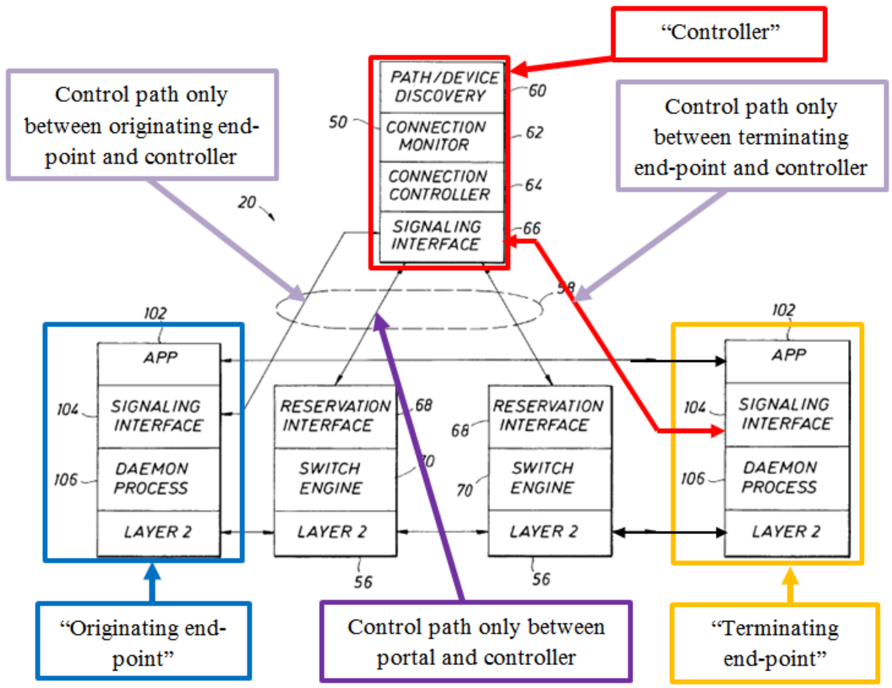
[9.1] ***wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating directly with the terminating end-point.***

281. Golden teaches that the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating directly with the terminating end-point.

282. Golden illustrates endstations in FIG. 9 as "hosts 102": "the network includes ***one or more hosts 102*** that have been configured with enhanced functionality for directly requesting a reserved connection from ECP 50." ERIC-1007, 13:25-27 (emphasis added). In particular, the host 102 is identified as "directly requesting a reserved connection from ECP 50," and Golden continues that the destination endpoint can, instead of being a "conventional host/router 94," be another host "similarly upgraded as host 102 [i.e., to communicate directly with the ECP 50].” ERIC-1007, 13:25-29, 36-40.

283. Golden expressly describes such a scenario where the terminating end-point is also an upgraded host 102: “for connection requests sent to host 102 from another network host, these are received by daemon process 106 via signaling interface process 104. … [ECP 50] ***realizes it can signal directly to host 102 [terminating end-point] whether to accept the request [from an originating host]***. When such requests are ***received by host 102***, daemon process 106 activates user interface process 108 … Daemon process 106 then formats ***an answer message which is sent to ECP 50 via signaling interface process 104***. Similar processing is performed for connection termination requests from other hosts.” ERIC-1007, 15:12-30 (emphasis added).

284. This is illustrated in a modified/annotated FIG. 9 of Golden below, where the “conventional host/router 94” is replaced with another host 102 “similarly upgraded as host 102” from which the request originates:



ERIC-1007, FIG. 9 (modified and annotated).

285. As would be recognized by one having ordinary skill in the art, where the terminating end-point is similarly upgraded to be a host 102 (e.g. as illustrated in annotated FIG. 9 above), it will receive directly from the ECP 50 the signal for whether to accept the request from the originating host 102. The connection requests thus received at the terminating end-point (upgraded host 102) result in reserving resources on the receiving host 102 that are for the receiving host 102 as part of the connection. Further, the terminating end-point (upgraded as a host 102) responding with whether the request is accepted or not constitutes an act of negotiation directly between the ECP 50 (that receives the answer message) and the host 102 (the terminating end-point) for far-end resources for the terminating end-point.

286. Thus, Golden's teachings regarding the terminating end-point also being upgraded as a host 102, and that the ECP signals directly to the host 102 whether to accept a connection request, teaches "wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating directly with the terminating end-point" as recited in the claim.

10. Dependent Claim 11

[11.0] ***The method of claim 1***

287. See the analysis of claim elements [1.0] through [1.10].

[11.1] ***wherein the connection is a point-to-point connection between only the originating and terminating end-points.***

288. Golden teaches that the connection is a point-to-point connection between only the originating and terminating end-points.

289. According to Golden, "[t]he enterprise control point identifies a path within the network that can satisfy the requested QOS/COS and ***reserves the requested resources all along the path from beginning to end***." ERIC-1007, 5:47-50 (emphasis added). "There are many advantages that this embodiment of the invention provides over conventional networks supporting IEEE 802.1P/Q. For example, the desired reservation can be maintained consistently throughout the duration of the connection, and ***for each switch from host to host along the path***." ERIC-1007, 13:10-15 (emphasis added).

290. A person having ordinary skill in the art would have recognized that this path between hosts, through each switch, would be a point-to-point connection between the originating and destination hosts. In particular, Golden further teaches that the result of the reservations at every point along the path constitutes a virtual circuit (e.g., a virtual path), stating that Golden teaches "a technique for adapting an existing packet-switched/routed infrastructure so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network." ERIC-1007, 1:14-18.

291. This is consistent with the statements in the '119 Patent that a point-to-point connection refers to a single originating point and a single terminating point, regardless of whether there are intervening network nodes that carry the traffic between the two points or not. *See, e.g.*, ERIC-1001, FIG. 7 (showing traffic between a single originating point and a single terminating point, as compared to FIG. 4 where traffic from a single originating point goes to multiple terminating points).

292. Thus, Golden's determined path through each switch between the originating and destination hosts teaches "wherein the connection is a point-to-point connection between only the originating and terminating end-points" as recited in the claim.

11. <u>Dependent Claim 12</u>

[12.0] ***The method of claim 1***

293. See the analysis of claim elements [1.0] through [1.10].

[12.1] ***wherein the connection is a point-to-multipoint connection between one of the originating and terminating end-points and the other of the originating and terminating end-points and at least one other end-point.***

294. Golden teaches that the connection is a point-to-multipoint connection between one of the originating and terminating end-points and the other of the originating and terminating end-points and at least one other end-point.

295. **First**, Golden teaches that the connection extends between end-points. *See* analysis of claim element [1.1].

296. **Second**, Golden teaches a quality of service solution between a first sender (an originating end-point) and multiple remote receivers (terminating end-points) by reference to multicast: "FIG. 1 illustrates an example of using RSVP in ***a conventional multicast session***." ERIC-1007, 6:22-23 (emphasis added). "Recently, protocol-based QOS solutions have been attempted. One such solution is Resource Reservation Protocol (RSVP), which is an application layer protocol. This is illustrated in FIG. 1. Downstream messages along the path ***from a sender S1 to remote receivers RCV1, RCV2 and RCV3*** include Path, PathTear, ResvErr, and ResvConf. Upstream messages along the path from receivers RCV1, RCV2 and RCV3 to sender S1 include Resv, ResvTear and PathErr." ERIC-1007, 1:49-57 (emphasis added).

297. It would have been obvious to combine Golden's teachings regarding use of the ECP for "providing guaranteed quality and/or class of service (QOS/COS) in a local or wide area network or access networks" with the multicast QoS teachings in the background section of Golden for several reasons. For example, Golden's ECP is interoperable with existing protocols, including RSVP (the example protocol in Golden's multicast session). *Id.*, 1:11-21, 5:36-50.

298. It would have been obvious to one having ordinary skill in the art that point-to-multipoint connections were a well-known option that the solutions provided in Golden would be compatible with. Point-to-multipoint connections were well known in the art as of the earliest priority date of the '119 Patent as well as Golden. Indeed, as the '119 Patent acknowledged, "MPLS standards have expanded to include point-to-multipoint multicasting … and resource reservation protocols [including RSVP]." ERIC-1001, 2:16-23. Pointing to an MPLS router, the '119 Patent states that the "the point-to-multipoint multicasting capabilities of MPLS" can be used to instruct routers to multicast traffic. *Id.*, 2:31-34. Further, Golden taught in some of its embodiments another use of multicast for "broadcasting messages" to multiple network elements. ERIC-1007, 18:17-21. In that embodiment, Golden taught how to group the multiple network elements together and "assign a multicast address to the group." *Id.*

299. Thus, utilizing Golden's ECP solution with the well-known use of multicast (both generally and MPLS in particular) would have been nothing more than the combination of known elements according to known methods to yield predictable results (e.g., transmission of data from a source to multiple destinations with the request quality of service reserved end-to-end by the ECP in Golden). This would have also been nothing more than the duplication of parts, namely the duplication of Golden's QoS reservations end-to-end to multiple paths, and would have been obvious to a person having ordinary skill in the art.

300. In addition, Golden expressly contemplated that the ECP would interoperate with existing protocols, including RSVP: "[t]he present invention relates to a method and apparatus for providing guaranteed quality and/or class of service (QOS/COS) in a local or wide area network or across networks, and more particularly, to a technique for adapting an existing packet-switched/routed infrastructure so that on-demand reserved-bandwidth virtual circuit connections with guaranteed QOS and/or COS between any endstations within the network or between networks can be established, ***while providing interoperation with and improving the performance of existing reservation protocols and frame formats***." ERIC-1007, 1:11-21 (emphasis added).

301. In Golden, "[t]he enhanced switches detect packets ***that include requests for reserved connections according to existing reservation protocols such as RSVP*** and IEEE 802.1P/Q. ***Such detected packets are forwarded to the***

enterprise control point for processing via a reserved signaling channel. The enterprise control point identifies a path within the network that can satisfy the requested QOS/COS and reserves the requested resources all along the path from beginning to end." ERIC-1007, 5:36-50 (emphasis added).

302. Accordingly, because Golden teaches that the ECP interoperates with existing protocols such as RSVP, and that a point-to-multipoint (multicast) connection may exist between source and destinations using RSVP, further because point-to-multipoint connections were in common usage in the relevant time period, it would have been obvious to a person having ordinary skill in the art to implement Golden's ECP teachings with Golden's multicast teachings in a reservation context. Doing so would have been obvious to try, because as Golden identifies multicast was applicable in several scenarios with a reasonable expectation of success in each.

303. Further, Golden teaches that the bandwidth is required for various applications including video conferencing: "[h]owever, with the proliferation of new technologies using real time applications such as ***video conferencing*** and ***Internet telephony***, guaranteed quality of service (QOS) with minimal and predetermined transmission latency has become increasingly desired." ERIC-1007, 1:43-47 (emphasis added). "Additional functionality can also be built in to launch a software application desired for that connection (such as a ***video*** or audio

conference).” ERIC-1007, 14:60-62 (emphasis added).

304. It would have been obvious to a person having ordinary skill in the art that video conferencing would include multipoint scenarios where a user is participating in a video conference with several other participants. For example, U.S. Patent No. 7,164,435 to Wang *et al.* (filed 12/31/2003 with priority to 2/10/2003) evidences that videoconferences involved “point-to-point and multipoint conferences.” ERIC-1012, 1:29-34. A POSITA would have known how to implement to achieve the video conferencing in Golden.

305. Thus, Golden’s ECP that interoperates with existing protocols, including RSVP, as well as Golden’s teachings regarding multicast communications between sender and receivers, teaches “wherein the connection is a point-to-multipoint connection between one of the originating and terminating end-points and the other of the originating and terminating end-points and at least one other end-point” as recited in the claim.

IX. Claims 10 and 13-15 are unpatentable over 35 U.S.C. § 103 over Golden in view of Fichou, further in view of Har.

306. It is my opinion that Golden in view of Fichou, further in view of Har, renders obvious at least claims 10 and 13-15 of the ’119 Patent.

A. Overview of Har

307. Har teaches “[a] method and several novel components to reduce communications delays and improve video and audio quality in IP telephony systems." ERIC-1010, Abstract. According Har's teachings, delay is reduced by enabling "a single codec to be implemented for an entire communications path without need for special H.323 endpoint devices" between a calling endpoint and a called endpoint. ERIC-1010, ¶¶ [0012], [0013].

308. Har teaches that this is accomplished by biasing the gateway between endpoints "into selecting a common codec for both receive and transmit channels." ERIC-1010, ¶ [0037]. In particular, a calling endpoint, EP-1 in Har, includes a list of codecs that it supports in a request it sends to the gateway. ERIC-1010, ¶ [0041]. The gateway extracts the codec list, creates a remote codec list from the list extracted from EP-1, possibly includes its own local codec list, and sends the remote code list to the destination endpoint EP-2. ERIC-1010, ¶ [0041]. Har teaches that a codec is selected from the remote codec list (the EP-2 in the example given in Har) and passed back to the calling endpoint EP-1. ERIC-1010, ¶ [0045]. As a result, "a single end-to-end codec is guaranteed to be used along the entire communications path." ERIC-1010, ¶ [0045].

309. Har teaches that the invention supports audio and video codecs so that multimedia data beyond just voice may be transmitted between endpoints without codec conversions being necessary. *See* ERIC-1010, ¶¶ [0081], [0084]. Har further teaches that its inventive aspects facilitated by the gateway are implemented as hardware or as software added to computers. ERIC-1010, ¶¶ [0079]-[0080].

B. Reasons to Combine Golden and Har

310. It is my opinion that one of ordinary skill in the art would have been motivated to combine the teachings of Golden with the teachings of Har for the reasons set forth below.

311. Golden contemplated that the ECP 50 performs various control functions relating to "setting up and tearing down reserved connections" by way of the ECP's "connection controller function 64." ERIC-1007, 8:29-31. The additional features of Fichou and Lee would be combined with Golden for the reasons set forth above. A person having ordinary skill in the art would have understood that codec selection (video codec selection in particular, such as taught by Har) would be a part of setting up a reserved connection. Golden itself contemplates video to be one of the types of data reserved connections would convey (e.g., "video conferencing"). ERIC-1007, 1:43-45, 14:60-62.

312. Golden teaches the desirability of obtaining quality of service guaranteed connections, stating that "with the proliferation of new technologies using real time applications such as video conferencing and Internet telephony, ***guaranteed quality of service (QOS) with minimal and predetermined transmission latency has become increasingly desired***." ERIC-1007, 43-47. Thus, a person having ordinary skill in the art would have been motivated, as part of implementing the improvements provided by Golden in guaranteeing quality of service, to further improve "minimal and predetermined transmission latency."

313. Har provides such a teaching, stating that the findings from the state of the art at that time "***clearly substantiates that multiple codec translations have adverse effects on speech quality resulting from delays***. With the current state of the Internet where quality of service is not assured, ***such delays in multimedia delivery*** of greater than 150 milliseconds ***is often not tolerable by users.***" ERIC-1010, ¶ [0008].

314. Using Har's teachings with respect to the gateway that negotiates between endpoints with the ECP in Golden, namely "incorporated within the existing functionality" of the ECP, provides the advantage of guaranteeing "***a single end-to-end codec … to be used along the entire communications path***." ERIC-1010, ¶ [0045]. Further, as Har states, "[t]his significantly reduces latency resulting from codec translations," because those translations are no longer required. ERIC-1010, ¶ [0014].

315. Further, the combination of Har's teachings regarding the gateway's functionality in the ECP of Golden would have been within the level of ordinary skill in the art. As Har notes, the teachings regarding the gateway can be embedded as hardware or "manifested as software and added to software-based … computers" such as an entity between the originating and terminating end-points. ERIC-1010, ¶¶ [0079]-[0080]. Further, the functionality of Har operates with communication to and from each of the endpoints, which Golden provides at least via its "reserved signaling channel[s] 58" with its hosts 102. Thus, the call signaling in Har from the originating endpoint to the gateway, and the call signaling to the destination endpoint from the gateway, etc., find support in the reserved signaling channels of Golden.

316. To the extent that any modifications would have been needed to the teachings of Golden with respect to the ECPs in order to accommodate the teachings of Har with respect to the gateway codec negotiation functionality, such would have been within the level of ordinary skill in the art.

317. Accordingly, a person of ordinary skill in the art before the earliest alleged priority date of the '119 Patent would have been motivated to combine Har's teachings regarding negotiating a single codec end-to-end to avoid conversions along the communications path (and, thus, reduced delay in transmission) with Golden's teaching of a policy server for an ECP for setting up reserved end-to-end connections, because Golden's motivation was to guarantee quality of service with "minimal and predetermined transmission latency" (by way of its centralized ECP). This predictable and desirable combination would yield a system with the ability to negotiate a single codec end-to-end to reduce delay, as taught by Har, while reserving the connection end-to-end for a guaranteed quality of service as taught by Golden.

1. Dependent Claim 10

[10.0] ***The method of claim 1***

318. See the analysis of claim elements [1.0] through [1.10].

[10.1] ***wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating a video codec for use with the connection to avoid video codec conversion between the originating and terminating end-points.***

319. Golden in combination with Fichou and Har teaches that the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating a video codec for use with the connection to avoid video codec conversion between the originating and terminating end-points.

320. **First**, Golden teaches negotiating by the ECP with far-end resources as discussed above with respect to claim element [1.6].

321. **Second**, to the extent that Golden does not expressly teach video codecs with respect to the resources negotiated at the far-end, Har teaches negotiating a video codec for use with the connection to avoid video codec conversion between the originating and terminating end-points, which teaching a person having ordinary skill in the art would have been motivated and able to incorporate with the ECP of Golden.

322. Specifically, Har teaches a gateway that negotiates with a destination endpoint (EP-2) to select a codec that is the same between the EP-2 and the originating endpoint (EP-1): "[t]he present invention defines a Virtual End-to-End

Codec (VEEC) method that ***bias the gateway into selecting a common codec for both receive and transmit channels***." ERIC-1010, ¶ [0037] (emphasis added).

323. Har teaches that the gateway receives the list of available codecs from the EP-1: "[a]s ***the codec list arrives*** early with the Q.931 setup request 202 in the Fast Connect, the gateway GW spawns a new process GW-EP-A 200 to service EP-1. In the teachings of this present invention, ***the gateway GW extracts the codec list of EP-1*** from the Q.931 setup message and makes preparations to extend the codec list 203 from EP-1 to EP-2, optionally including GW's local codec list, by ***creating a remote codec list***. ***The gateway GW*** spawns a new process GW-EP-B 201, which ***sends this remote codec list*** in the Fast Connect Q.931 request 217 ***to destination endpoint EP-2***." ERIC-1010, ¶ [0041] (emphasis added).

324. Har continues: "***[t]he resulting H.245 exchange 209 between EP-1 and GW-EP-A will confirm G.723.1 as the single virtual codec to use in the transmitting and receive logical channels 212. A similar H.245 exchange 211 takes place between GW-EP-B and EP-2.***" ERIC-1010, ¶ [0043] (emphasis added). As a result, "***a single end-to-end codec is guaranteed to be used along the entire communications path***." ERIC-1010, ¶ [0045] (emphasis added).

325. Thus, Har teaches that the gateway operates between the two endpoints to negotiate a single codec between them, for example by way of a "single codec negotiation module 130" in order to implement the invention in Har.

See ERIC-1010, ¶ [0085]. Indeed, whether with an express module or not, Har's teachings with respect to a gateway receiving codec information from an originating endpoint, conveying codec information to the destination endpoint, and finalizing the "H.245 negotiation" for a common codec constitutes a negotiation by the gateway. *See* ERIC-1010, ¶ [0057].

326. **Third**, Har teaches that the gateway functionality enhanced to facilitate the "single end-to-end codec" along the entire communications path is implemented as hardware (e.g., add-on adapter) or software: "the Virtual Codec Unit (VCU) and Virtual End-to-End Codec (VEEC) method ***can be embedded in hardware as special add-on adaptors or attachments*** to existing gateway routers, transforming them to gateway routers that support the teachings of the present invention and H.323 protocol. ***The invention can also be manifested as software and added to software-based*** routers and ***computers*** to enhance such equipment, enabling them to support the VEEC method in synchronizing the H.323 call signaling and control protocol." ERIC-1010, ¶¶ [0079]-[0080] (emphasis added).

327. **Accordingly**, Har teaches that the functionality to assure the same codec between endpoints can be achieved in hardware or software that can be integrated with a variety of options, including "computers," of which a person having ordinary skill in the art would have recognized an "enterprise control point" as taught in Golden would be an example.

328. Fourth, Har teaches that the codecs which the invention accommodates include video codecs: "FIG. 7 also shows ***the components included within the scope of the ITU-H.323***: … Audio Codec 704, ***Video Codec 705*** …." ERIC-1010, ¶ [0084] (emphasis added). "While the present invention as described has used voice transmission for illustration, it will be apparent to one skilled on the art that ***other multimedia data*** may be similarly transmitted between H.323 endpoints using the present invention." ERIC-1010, ¶ [0081] (emphasis added).

329. It would have been obvious to a person having ordinary skill in the art that "other multimedia data" would include video data, as Har also teaches that "video codec" components are within the scope of what the invention supports for codec selection. Therefore, the combination of Golden's ECP incorporating the teachings of Har's hardware or software to enable setting up "a single end-to-end codec … guaranteed to be used along the entire communications path," where the codec may be a video codec, renders this claim limitation obvious.

330. Thus, Golden's ECP with control functions, in combination with Har's teachings with respect to negotiating a single codec from end to end, teaches "wherein the negotiating, by the controller, to reserve far-end resources for the terminating end-point includes negotiating a video codec for use with the connection to avoid video codec conversion between the originating and terminating end-points" as recited in the claim.

2. Independent Claim 13

[13.0] ***A method for providing bandwidth on demand comprising:***

331. See the analysis of claim element [1.0].

[13.1] ***receiving, by a controller positioned in a network, a request for a high quality of service connection between an originating end-point and a terminating end-point,***

332. See the analysis of claim element [1.1].

[13.2] ***wherein the request includes at least one of a requested amount of bandwidth and a video codec;***

333. See the analysis of claim element [1.2].

[13.3] ***determining, by the controller, whether the originating end-point is authorized to use the requested amount of bandwidth or the video codec;***

334. See the analysis of claim element [1.3].

[13.4] ***communicating, by the controller, with the originating and terminating end-points to ensure that the connection is free from video codec conversion;***

335. See the analysis of claim element [10.1]. In particular, as discussed in [10.1], Har teaches negotiating a video codec between originating and destination endpoints. ERIC-1010, ¶[0037]. Because Har teaches negotiating a video codec between endpoints, Har (as combined with the ECP in Golden) therefore also teaches that the ECP of Golden as modified with the teachings of Har communicates with the originating and destination end-points, as "negotiating" as shown in claim element [10.1] is a form of "communicating" per claim element

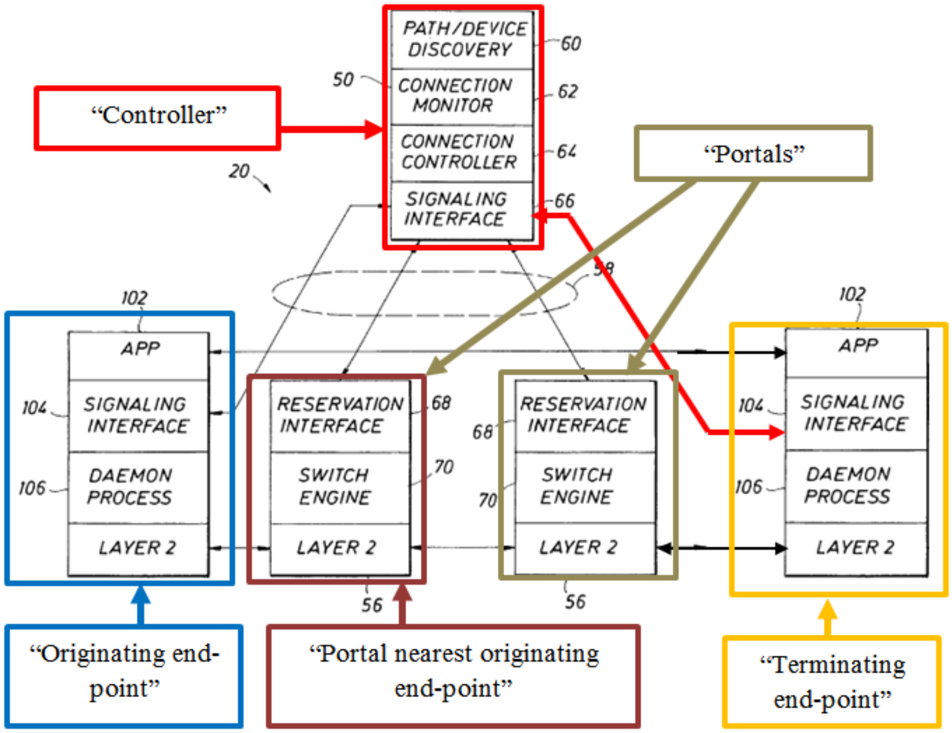
[13.4].

[13.5] ***directing, by the controller, one of a plurality of portals that is positioned in the network nearest to the originating end-point and physically separate from the controller to allocate local port resources of the portal for the connection; and***

336. See analysis at claim element [1.5], which shows directing, by the controller, a portal that is positioned in the network and that is physically separate from the controller to allocate local port resources for the connection.

337. Golden also teaches directing, by the controller, one of a plurality of portals that is positioned in the network nearest to the originating end-point and physically separate from the controller to allocate local port resources for the connection.

338. Golden teaches a plurality of portals, and that at least one is directed by the ECP to allocate local port resources. As illustrated in FIG. 9, the switch 56 nearest the originating endpoint receives direction from the ECP 50 to make the noted allocation via signaling channel 58:



ERIC-1007, FIG. 9 (modified and annotated).

339. As would have been recognized by a person having ordinary skill in the art, the switch 56 next to the originating host 102 would be the "nearest" to the originating host 102, whether by number of hops, physical distance, or both. It is obvious that, for an originating host 102, there will be a switch 56 that is nearest to the host 102. This is illustrated in the annotated FIG. 9, where the switch 56 next to the originating host 102 is labeled as the portal nearest the originating end-point based on its proximity thereto as compared to the other switch 56 further down the path.

340. Golden further teaches that the ECP directs the switch nearest the originating end-point to allocate local port resources for the connection. *See, e.g.*, ERIC-1007, 9:60-66; 10:26-36; 11:53-54; *see also* analysis of claim element [1.5].

[13.6] ***sending, by the controller to the portal, routing instructions for the connection, wherein traffic for the connection is routed by the portal based only on the routing instructions,***

341. See analysis at claim element [1.7]. As noted in claim element [1.7], Golden teaches "providing, by the controller to the portal," and therefore also teaches "sending" as providing includes sending. Further, as noted in claim element [1.7], Golden in combination with Lee teaches that the routing instructions it provides are for the traffic corresponding to the connection. Golden in combination with Lee likewise teaches the same aspects for "traffic for the connection."

[13.7] ***and wherein the connection extending from the originating end-point to the terminating end-point is provided by a dedicated bearer path that includes a required route supported by the portal and dynamically provisioned by the controller,***

342. See analysis at claim element [1.9].

[13.8] ***and wherein control paths for the connection are supported between each of the originating and terminating end-points and the controller and between the portal and the controller.***

343. See analysis at claim element [1.10]. Because it was shown with respect to claim element [1.10] that the control paths in Golden are supported only between the originating and terminating endpoints and the controller and between the portal and the controller, Golden also shows that the control paths for the connection are supported between each of the originating and terminating endpoints and the controller and between the portal and the controller, as per claim element [13.8].

3. Dependent Claim 14

[14.0] ***The method of claim 13***

344. See the analysis of claim elements [13.0] through [13.8].

[14.1] ***further comprising negotiating, by the controller, to reserve far-end resources on the terminating end-point.***

345. See analysis of claim elements [1.6] and [10.1].

346. Specifically, as discussed with respect to claim 10, Har teaches a gateway that receives codec information from the originating endpoint and communicates to the destination endpoint regarding codec selection: "***[t]he gateway GW*** spawns a new process GW-EP-B 201, which ***sends this remote codec list*** in the Fast Connect Q.931 request 217 ***to destination endpoint EP-2***. As a result of the present invention, endpoint EP-2 receives the remote codec list 204." ERIC-1010, ¶ [0041] (emphasis added). "***The resulting H.245 exchange 209 between EP-1 and GW-EP-A will confirm G.723.1 as the single virtual codec to use in the transmitting and receive logical channels 212. A similar H.245 exchange 211 takes place between GW-EP-B and EP-2.***" ERIC-1010, ¶ [0043] (emphasis added).

347. The confirming of the codec in the destination endpoint is an example of resources reserved on the destination endpoint in Har. As would have been recognized by a person having ordinary skill in the art, the selection of codec at a device, such as a destination endpoint, itself impacts multiple resources including processor resources, bandwidth resources, and memory resources for execution of that confirmed codec.

348. Thus, Golden's ECP with control functions, in combination with Har's teachings with respect to reserving a codec at the destination endpoint, teaches "further comprising negotiating, by the controller, to reserve far-end resources on the terminating end-point" as recited in the claim.

4. <u>Dependent Claim 15</u>

[15.0] ***The method of claim 14***

349. See analysis of claim elements [13.0] through [13.8] and [14.0] through [14.1].

[15.1] ***wherein the negotiating is performed with one of another controller associated with the terminating end-point or directly with the terminating end-point.***

350. See analysis at claim element [8.1] (showing how Golden teaches that the negotiating is performed with another controller associated with the terminating end-point) and claim element [9.1] (showing how Golden teaches that the negotiating is performed directly with the terminating end-point).

351. Thus, Golden's showing of both alternatives teaches "wherein the negotiating is performed with one of another controller associated with the terminating end-point or directly with the terminating end-point" as recited in the claim.

X. Claim 16 is unpatentable over 35 U.S.C. § 103 over Golden in view of Fichou, Lee, and Har, further in view of Pillai.

352. It is my opinion that Golden in view of Fichou and Har, further in view of Pillai, renders obvious at least claim 16 of the '119 patent.

A. Overview of Pillai

353. Pillai is directed to user configurable platforms that are adaptable for use with "a variety of separate and distinct support systems." ERIC-1011, ¶ [0044]. One aspect of Pillai's teachings describes "method and apparatus for using the integration platform 700 to support combined and integrated billing and rating for both voice and data services," including "prepaid integrated voice and data services." ERIC-1011, ¶ [0071].

354. Pillai teaches that, to improve upon techniques for management of prepaid services, a "separate control element, a Real-Time Universal Resource Consumption Monitor (RURCM) 300 … is provided to keep track of ongoing usage [o]f system resources in real-time or approximately real-time, and applies prepaid service definitions to effectively regulate network usage." ERIC-1011, ¶ [0087]. Pillai teaches that the RURCM 300 "is responsible for maintaining real-time active connections with the network elements … which regulate the user's ongoing calls/sessions." ERIC-1011, ¶ [0088].

355. For example, the RURCM 300 in Pillai may periodically poll the network elements, such as switches or routers, or configure the network elements to send live updates to the RURCM 300 after triggering by a threshold. ERIC-1011, ¶ [0088]. According to Pillai, the RURCM 300 compares the usage "against the authorized limits specified by the pre-paid policy." ERIC-1011, ¶ [0089]. "Using real-time information about resource usage by the customer, the RURCM 300 decides at what point one or more of the ongoing sessions/connections should be terminated." ERIC-1011, ¶ [0093].

356. Based on the result of a determination to terminate the connection, the RURCM 300 "instructs the appropriate network switch … to terminate the ongoing call/session." ERIC-1011, ¶ [0093].

B. Reasons to Combine Golden and Pillai

357. It is my opinion that one of ordinary skill in the art would have been motivated to combine the teachings of Golden with the teachings of Pillai for the reasons set forth below.

358. As noted above Golden contemplated that the ECP performs various control functions, including a "[c]onnection monitor function 62 [that] maintains a permanent list of connections, including respective permanent connection records 65 that show the elapsed time of the connection, the parties involved, and the resources used. Such records can be used for ***billing and resource management***, for example." ERIC-1007, 8:34-39 (emphasis added).

359. Golden does not explicitly state what the billing and resource management functions could entail. However, a person having ordinary skill in the art would have understood billing and resource management to include a variety of possibilities. In particular, a person having ordinary skill in the art would have recognized, with respect to billing, that in telecommunications generally (and network usage in particular) billing in some applications is based on usage in a post-use billing scheme or prepaid usage up to an agreed-upon amount.

360. Because Golden remains general about the billing and resource management functions that may be implemented by the ECP, a person having ordinary skill in the art would have been motivated to look at the different well-known techniques in the industry then available for billing and resource management.

361. Pillai is an example of certain billing and resource management functions that a controller implements in a telecommunications context. Pillai states that it "relates to the integration of electronic and software systems and subsystems used in the operation of a telecommunications enterprise." ERIC-1011, ¶ [0002]. Specifically, Pillai contemplates particular ways in which to "support combined and integrated billing and rating for … data services in a distributed wireless architecture; to support prepaid integrated … data services in cellular network architectures …" ERIC-1011, ¶ [0071].

362. Notably, Pillai explains that the "teachings [in Pillai] may be applied to other types of systems, and are not limited for use with wireless telecommunication systems." ERIC-1011, ¶ [0050]. Pillai, as part of its focus on improving the "effective flow of data between … support systems, while providing for data integrity and efficient operation of the telecommunication system" (ERIC-1011, ¶ [0059]), teaches the separate control element RURCM 300 which receives traffic usage updates for data connections from switches in the network, as well as determines based on real-time usage whether the connection should be terminated.

363. Using these teachings from Pillai with the ECP in Golden provides the advantage of managing prepaid services (ERIC-1011, ¶ [0087]) as well as "ensuring that the customer only has access to whatever was specified in the prepaid contract." ERIC-1011, ¶ [0093]. Market forces dictate that service providers be compensated for usage of their communication networks such that implementation of the billing and access teachings of Pillai are readily combinable with Golden, since Pillai's teachings further detail an example of Golden's "billing and resource management" in the ECP's control functions. The teachings of Pillai therefore further detail an example of "billing and resource management" that Golden already teaches that the control functions of the ECP include.

364. Implementation of the teachings of Pillai with respect to the RURCM and the switches communicating therewith with the teachings of Golden regarding the ECP would have been well within the ability of a person having ordinary skill in the art. Pillai contemplated that the RURCM would be a separate element from other aspects of the network. Further, Golden left open how the billing and resource management functions would be accomplished for the ECP, which was also a separate control element.

365. To the extent that any modifications would have been needed to the teachings of Golden in order to accommodate the teachings of Pillai, they would have been within the level of ordinary skill in the art. Golden left open what the billing and resource management would entail, and Pillai teaches ways to implement both billing and resource management.

366. As a result, a person having ordinary skill in the art before the earliest alleged priority date of the '119 Patent would have been motivated to combine Pillai's teachings of specific billing and resource management functions with Golden's teaching of the ECP including control functions for aspects such as billing and resource management, for example by Golden's ECP implementing the RURCM functionality taught by Pillai. This is because Golden directed a person having ordinary skill in the art to look for additional details regarding what billing and resource management entails for a network. Such a combination would yield the predictable result of a control point (ECP) in Golden communicating with a switch in Golden to receive usage information from the switch, and determinations made therefrom, as taught by Pillai.

1. Dependent Claim 16

[16.0] ***The method of claim 13 further comprising:***

367. See analysis of claim elements [13.0] through [13.8].

[16.1] ***receiving, by the controller, a notification from the portal that traffic on the connection has exceeded an authorized limit; and***

368. Golden in combination with Fichou, Lee, Har, and Pillai teaches receiving, by the controller, a notification from the portal that traffic on the connection has exceeded an authorized limit.

369. **First**, as noted above, Golden teaches a controller, ECP 50. *See* analysis of claim elements [13.1] and [1.1].

370. **Second**, Golden teaches that the ECP 50 includes multiple functions: "[c]onnection monitor function 62 maintains a permanent list of connections, including respective permanent connection records 65 that show the elapsed time of the connection, the parties involved, and the resources used. Such records can be used for ***billing and resource management***, for example." ERIC-1007, 8:34-39.

371. **Third**, to the extent that Golden does not explicitly teach what the uses with respect to "billing and resource management" may entail, and particularly that the switch notifies the ECP that traffic on the reserved connection has exceeded an authorized limit, Pillai teaches these limitations.

372. In particular, Pillai teaches a controller that is separate from other network elements: "[i]n order to overcome some of the above-described disadvantages of current techniques for management of prepaid services, ***a separate control element, a Real-Time Universal Resource Consumption Monitor (RURCM) 300 (FIG. 3) is provided to keep track of ongoing usage*** [o]f system resources in real-time or approximately real-time, and applies prepaid service definitions to effectively regulate network usage." ERIC-1011, ¶ [0087] (emphasis added).

373. Pillai teaches that a switch monitors traffic and notifies the RURCM 300 when usage exceeds an authorized limit: "The RURCM agent 300 is responsible for maintaining real-time active connections with the network elements, such as the MSC 100 and the PDSN 150, ***which regulate the user's ongoing calls/sessions***. The RURCM agent 300 uses these connections to either periodically poll the network switches to obtain usage statistics, or to configure thresholds on the switches that trigger ***the switch to send live updates to the RURCM 300***." ERIC-1011, ¶ [0088] (emphasis added).

374. Pillai teaches that the "usage" updated from the switches to the RURCM 300 is compared "against the authorized limits specified by the pre-paid policy." ERIC-1011, ¶ [0089]. Accordingly, Golden's ECP 50 modified by the teachings of Pillai result in a controller that can monitor and control specific usage as an example of "resource management," with Pillai's teachings of a switch notifying a control element (RURCM in Pillai) that usage has exceeded authorized limits.

375. For the reasons to combine Pillai with Golden, please see Section X.B above.

376. Thus, Golden's ECP that includes control functions for billing and resource management in combination with Pillai's specific example of the same involving the teaching of a switch communicating with a separate control element regarding traffic usage, teaches "receiving, by the controller, a notification from the portal that traffic on the connection has exceeded an authorized limit" as recited in the claim.

[16.2] ***instructing the portal, by the controller, whether to terminate or allow the connection to continue.***

377. Golden, in view of Fichou, Har, and Pillai, teaches instructing the portal, by the controller, whether to terminate or allow the connection to continue.

378. **First**, Golden teaches that the ECP 50 includes multiple functions, such as billing and resource management. *See* ERIC-1007, 8:34-39.

379. **Second**, to the extent that Golden does not teach particular details regarding billing and resource management, Pillai teaches that the control element determines whether to terminate the connection: "[u]sing real-time information about resource usage by the customer, ***the RURCM 300 decides at what point one***

or more of the ongoing sessions/connections should be terminated." ERIC-1011, ¶ [0093] (emphasis added).

380. As a result of the determination, Pillai teaches conveying the determination to the portal (switch as taught in Pillai): "[a]fter making this decision, the RURCM 300 instructs the appropriate network switch (the MSC 100 in this example) to terminate the ongoing call/session, thereby ensuring that the customer only has access to whatever was specified in the prepaid contract." ERIC-1011, ¶ [0093].

381. Thus, Golden's ECP that includes control functions for billing and resource management in combination with Pillai's specific example of determining to terminate a connection based on monitored usage, and sending that instruction to the appropriate switch, teaches "instructing the portal, by the controller, whether to terminate or allow the connection to continue" as recited in the claim.

XI. Conclusion

382. This declaration and my opinions herein are made to the best of my knowledge and understanding, and based on the material available to me, at the time of signing this declaration. I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code.

A. L. Narasimha Reddy

June 22 2017

Date Narasimha Reddy, Ph.D.