

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: SEARCHING SYSTEM, METHOD, AND P2P DEVICE FOR P2P
DEVICE COMMUNITY

DECLARATION OF DAVID B. LETT

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 under Section 1001 of Title 18 of the United States Code.

Date: 7/14/2025

By: David B. Lett
David B. Lett

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DECLARATION OF DAVID B. LETT

I, David B. Lett, of Duluth, Georgia, declare that:

I. INTRODUCTION

1. My name is David B. Lett, and I have been retained by counsel for Petitioners Reolink Innovation Inc. and Shenzhen Reolink Technology Co., Ltd. (“Reolink” or “Petitioners”) as an expert witness to provide assistance regarding U.S. Patent No. 9,727,655 (“the ’655 Patent”). Specifically, I have been asked to consider the validity of claims 1-19 of the ’655 Patent (the “Challenged Claims”).

2. I am being compensated for my time at my standard consulting rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the Challenged Claims. I have no financial interest in the outcome of this matter or on related litigation involving the ’655 Patent.

3. My analysis here is based on my years of education, research and experience, as well as my investigation and study of relevant materials, including those cited herein. I may rely upon these materials, my knowledge and experience, and/or additional materials to further explain and corroborate my analysis, and to respond to critiques of my analysis raised by the Patent Owner or the Patent Trial and Appeal Board (“Board”).

4. My analysis of the materials produced in this proceeding is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions that I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

II. BACKGROUND AND QUALIFICATIONS

5. I am over the age of 18 and am competent to provide this testimony. I have personal knowledge, or have developed knowledge of the technologies addressed in this declaration based upon my education, training, experience, and my review of the '655 Patent, its file history, and the related prior art. I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below.

6. I am a technical consultant and product development industry veteran with expertise in electronics, software, hardware, video, audio, and data communications (including wireless cellular and Bluetooth), having led product development organizations in cable, satellite, consumer electronics, asset tracking, remote tank logistics, and alarm industries. My current *curriculum vitae* is attached as Appendix A and some highlights follow.

7. I earned my B.S. in Electrical Engineering (1982) with high honors from the University of Tennessee in Knoxville, Tennessee. I also attended the

Georgia Institute of Technology from 1986 to 1987, completing 40% of the required degree hours for the M.S. Electrical Engineering program.

8. From 1982 to 1985, I worked at Scientific Atlanta as an Electrical Engineer designing video, audio, and data communications equipment for the cable television industry. I designed software and hardware including addressable data transmitters, video sync suppression scramblers, transaction format converters, and data channel monitors for addressable Cable Television systems and Set Top Boxes.

9. From 1983 to 1985, while working at Scientific Atlanta, I also worked as an Assistant Professor at DeVry Institute of Technology, teaching courses in electronics and microprocessor hardware/software.

10. From 1985 to 1990, I worked at Wegener Communications as a Senior Electrical engineer, designing satellite communications equipment including forward error correction (FEC) coding systems, PSK modems, and analog control systems for RF modulators and PSK demodulators. I was promoted to the Hardware Engineering Manager, where I managed product development of video, audio, and data satellite receivers, modulators, graphics display systems, DSP-based companders, FSK and PSK satellite modems, multiplexers, forward error correction (FEC) codecs, RF upconverters and downconverters, and baseband analog and digital processing components.

11. In 1990, I returned to Scientific Atlanta, which was acquired by Cisco in 2006. I worked as Engineering Manager running the set top box engineering group where I was promoted to Director and Vice President during my tenure until 2011. I led the design of many cable set top boxes and video, audio, and data networked systems for both on-demand and multicast services through the evolution of analog video, addressability, downloadable software, two-way interactivity, electronic program guides, digital video, software applications, high-definition TV, DVR, DOCSIS, cable modems, full spectrum tuners, and multiroom DVR. These systems implemented various technologies including distributed systems, content management servers, search engines, DOCSIS 1/2/3 and hybrid gateways, 802.11, IPTV, DVR, cable modems, ADSL, VDSL, DVB-T/C/S, bootloaders, factory diagnostics, application frameworks, Nagra, DRMs, conditional access, secure microprocessors, device management, Android, Adobe Flash, Linux, DVD play/record, MPEG-4, MPEG-2, H.264, NTSC, PAL, DAVIC, MoCA, high-performance CPUs, cablecards, network processors, HDMI, multiple video/audio display interfaces, 2D/3D graphics, and multiple RF tuners.

12. From 2011 to 2016, I worked for EchoStar Technologies, which served as the product development organization for sister company DISH Network. I served as Vice President of Engineering and was the Head of the Atlanta research and development center. I led the development of satellite set top boxes, consumer

electronic equipment, and a home automation and security system. Technologies used included networked systems, video/audio, IoT, H.265, HEVC, 3D, Satellite, wireless Zigbee, Z-Wave, Wi-Fi, Bluetooth, MoCA, transcoding, embedded C Linux applications, mobile applications (IOS and Android), SaaS, web applications (Javascript, HTML), BSS/OSS, AWS cloud storage, distributed systems, content management servers, search engines, 2-way video/audio streaming, authentication, and VoIP.

13. In 2016, I started an independent consulting business in technology and intellectual property projects. I have consulted in various technology areas and industries including consumer electronics, cable, satellite, television, video/audio/image processing, multimedia content, networking, security, camera, online advertising, and Internet of Things (IoT).

14. From 2019 to 2022, I worked as Chief Technology Officer for Telular, an Ametek company. I was responsible for the development of Industrial IoT (IIoT) recurring revenue solutions, combining wireless technologies (cellular, Bluetooth, sub-GHz, GPS, and satellite), purpose-built hardware, and SaaS in the commercial telematics, security and home automation markets and sold under the SkyBitz and Telguard Brands.

15. My record of professional service includes awards on products I designed and developed from several organizations in my field of expertise, including Best of Show, Technology Emmy, and Best of Innovations.

16. I am a named inventor on at least 118 issued patents and published patent applications corresponding to the areas of my professional work. The patents and published applications involving network devices and communication technologies include:

- U.S. Patent No. 9,495,860 titled “False Alarm Identification”
- U.S. Patent No. 9,882,736 titled “Remote Sound Generation for a Home Automation System”
- European Patent No. EP 1,552,698 titled “Video transmission systems and methods for a home network”
- U.S. Patent Nos. 8,120,924, 7,240,217, 6,785,817, 6,564,324, 6,212,278 and 5,440,632 titled “Reprogrammable subscriber terminal”
- U.S. Patent Application No. US2015/0160635 titled “Multi-Tiered Feedback-Controlled Home Automation Notifications”
- U.S. Patent No. 8,549,567 titled “Media Content Sharing Over a Home Network”

- U.S. Patent Nos. 9,247,409 and 9,691,261 titled “Home Automation Communications”
- U.S. Patent No. 5,657,414 and European Patent No. 0672323 titled “Auxiliary device control for a subscriber terminal”
- Canada Patent No. 2478838 titled “Exporting data from a digital home communication terminal to a client device”
- U.S. Patent No. 5,592,551 titled “Method and apparatus for providing interactive electronic programming guide”
- U.S. Patent No. 7,908,625 titled “Networked Multimedia System”
- U.S. Patent Nos. 7,861,272 and 7,849,486 titled “Networked subscriber television distribution”
- U.S. Patent Nos. 7,774,820 and 7,069,578 titled “Settop cable television control device and method including bootloader software and code version table for maintaining and updating settop receiver operating system software”
- U.S. Patent No. 5,715,515 titled “Method and apparatus for downloading on-screen graphics and captions to a television terminal”
- U.S. Patent No. 5,539,822 titled “System and Method for Subscriber Interactivity in a Television System”

- European Patent No. 1552698 and Canada Patent No. 25011112 titled “Video Transmission Systems and Methods for a Home Network”
- U.S. Patent No. 5,771,064 titled “Home communications terminal having an applications module”
- PCT Patent Application Publication No. WO 2004/047457 titled “Subscriber Network in a Satellite System”
- U.S. Patent No. 5,357,276 titled “Method of Providing Video On Demand with VCR Like Functions”
- U.S. Patent No. 9,941,623 titled “Flat ethernet cables and associated systems, devices, and methods”
- U.S. Patent Application Publication No. US2009/193452 titled “Media content sharing over a home network”
- U.S. Patent No. 4,817,148 titled “Signal scrambling transmission system”
- U.S. Patent No. 10,063,641 titled “Systems and methods for finding wireless signals sufficient for installation of wireless home automation devices”
- U.S. Patent No. 12,307,409 titled “Tractor-trailer id methods and system”

III. LEVEL OF ORDINARY SKILL IN THE ART

17. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art as of the effective filing date of the '655 Patent ("POSITA"), which I understand is Oct. 3, 2014. I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field; the types of problems encountered in the field; the teachings of the prior art; and the sophistication of the technology at the time of the alleged invention. I understand that a POSITA is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above. I understand that a POSITA also would have knowledge from the teachings of the prior art, including the art cited below.

18. Taking these factors into consideration, on or before Oct. 3, 2014, a POSITA relating to the technology of the '655 Patent would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or equivalent, and two years of work experience with network devices and communication technologies. Additional education might compensate for less experience, and vice versa.

19. By Oct. 3, 2014, my education and work experience was at least that of a POSITA. I am qualified to provide opinions concerning what a POSITA would

have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of that date.

IV. MATERIALS CONSIDERED AND RELIED UPON

A. Anticipation

20. In forming my opinions and reaching the conclusions described in this declaration, I have relied on the documents and materials cited herein as well as those identified in this declaration, including the '655 Patent, the prosecution history of the '655 Patent, and prior art references cited herein. These materials comprise patents, related documents, and printed publications. Each of these materials is a type of document that experts in my field would have reasonably relied upon when forming their opinions. I have also relied on my education, training, research, knowledge, and personal and professional experience in the relevant technologies and systems that were already in use prior to, and within the timeframe of the earliest effective filing date of the '655 Patent (Oct. 3, 2014).

21. Accordingly, as part of my independent analysis of the '655 Patent, I have analyzed the following publications and materials:

<u>Exhibit</u>	<u>Description</u>
EX1001	U.S. Patent No. 9,727,655 to Wu (“the '655 Patent”)
EX1002	Prosecution History of the '655 Patent (“the Prosecution History”)
EX1004	EP Publication No. 2,086,206 (“Schwan”)

<u>Exhibit</u>	<u>Description</u>
EX1005	U.S. Publication No. 2011/0087775 (“Lee”)
EX1006	U.S. Publication No. 2007/0226368 (“Strickland”)
EX1007	CN Publication No. 101018172 (“Li”)
EX1008	U.S. Publication No. 2005/0050028 (“Rose”)
EX1010	An Extensible Set-Top Box Platform for Home Media Applications (2005), <i>available at</i> https://www.researchgate.net/profile/Trevor_Smith9/publication/3181282_An_extensible_set-top_box_platform_for_home_media_applications/links/54e7d6a40cf25ba91c7a2012.pdf
EX1011	Integration of Mobile Devices into Popular Peer-to-Peer Networks (2009), <i>available at</i> https://ieeexplore.ieee.org/document/5175763
EX1012	U.S. Publication No. 2010/0094877 (“Garbe”)
EX1013	U.S. Publication No. 2009/0100128 (“Czechowski”)
EX1014	U.S. Publication No. 2003/0208621 (“Bowman”)
EX1015	U.S. Patent No. 8,332,482 (“Alexander”)
EX1016	U.S. Publication No. 2006/0218274 (“Labio”)
EX1017	U.S. Publication No. 2013/0054634 (“Chakraborty”)

22. Although this declaration refers to selected portions of the cited references, it should be understood that these are examples, and I recognize that a POSITA would have viewed the references cited herein in their entirety and in

combination with other references cited herein or cited within the references themselves.

V. LEGAL STANDARDS

23. I am not a lawyer and do not provide any legal opinions, but I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding meaning and validity of patent claims. I have applied the legal standards described below, which were provided to me by counsel for the Petitioners.

24. It is my understanding that assessing the validity of a U.S. patent based on a prior art analysis involves two steps. First, one construes the terms of the patent claims to understand what meaning one of ordinary skill in the art would have given the terms. Second, after the claim terms have been construed, one then assesses validity by comparing the patent claim properly construed to the “prior art.” I understand that the teaching of the prior art is viewed through the eyes of a POSITA as of the effective filing date of the ’655 Patent. My analysis as to what constitutes a POSITA is set forth above (§III).

A. Legal Standards for Prior Art

25. I have been informed that a patent claim is invalid as anticipated under 35 U.S.C. § 102 if each and every element of a claim, as properly construed, is found either explicitly or inherently in a single prior art reference. Under the principles of

inherency, if the prior art necessarily functions in accordance with, or includes the claimed limitations, it anticipates.

26. I have been informed that a claim is invalid under 35 U.S.C. § 102(a) if the claimed invention was known or used by others in the U.S., or was patented or published anywhere, before the applicant's invention. I further have been informed that a claim is invalid under 35 U.S.C. § 102(b) if the invention was patented or published anywhere, or was in public use, on sale, or offered for sale in this country, more than one year prior to the filing date of the patent application (critical date). And a claim is invalid, as I have been informed, under 35 U.S.C. § 102(e), if an invention described by that claim was described in a U.S. patent granted on an application for a patent by another that was filed in the U.S. before the date of invention for such a claim.

B. Legal Standard for Obviousness

27. My understanding is that a patent claim is invalid as obvious only if the subject matter of the claimed invention "as a whole" would have been obvious to a POSITA as of the earliest effective filing date of that patent claim. To determine the differences between a prior art reference (or a proposed combination of prior art references) and the claims, the question of obviousness is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious.

28. It is my understanding that there is no single way to define the line between true inventiveness on one hand—which is patentable—and the application of common sense and ordinary skill to solve a problem on the other hand—which is not patentable. For instance, factors such as market forces or other design incentives may be the source of what produced a change, rather than true inventiveness.

29. I understand that, when assessing obviousness, one may consider whether the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness. Additionally, one may consider whether there is some teaching or suggestion in the prior art to make the modification or combination of elements recited in the claim at issue. Also, one may consider whether the innovation applies a known technique that had been used to improve a similar device or method in a similar way and whether the claimed invention would have been obvious to try. In determining whether the claimed invention would have been obvious to try, the claim must be directed to a relatively small number of possible approaches to the problem for which a POSITA would have reasonably expected success implementing before the earliest effective filing date.

30. I understand that obviousness is assessed through the eyes of a POSITA as of the earliest effective filing date and that one should not consider what is known today or what is learned from the teaching of the patent.

31. I understand that an obviousness determination entails consideration of the scope and content of the prior art; the difference or differences, if any, between the claim of the patent and the prior art; the level of ordinary skill in the art at the time the claimed invention was made; and, if available, objective indicia of non-obviousness, also known as “secondary considerations.”

32. I understand that the secondary considerations can include: commercial success of a product due to the merits of the claimed invention; a long felt need for the solution provided by the claimed invention; unsuccessful attempts by others to find the solution provided by the claimed invention; copying of the claimed invention by others; unexpected and superior results from the claimed invention; acceptance by others of the claimed invention as shown by praise from others in the field or from the licensing of the claimed invention; teaching away from the conventional wisdom in the art at the time of the invention; independent invention of the claimed invention by others before or at about the same time as the named inventor thought of it; and other evidence tending to show obviousness. I understand that, to establish a secondary consideration, the evidence must demonstrate a nexus between that secondary consideration and the claimed invention.

VI. OVERVIEW OF CONCLUSIONS FORMED

33. This expert Declaration explains the conclusions that I have formed based on my analysis. To summarize those conclusions:

- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 1-4, 7-9, 11-13, 16, 18, 19 of the '655 Patent are anticipated by Schwan.
- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 1-4, 7-13, and 16-19 of the '655 Patent are obvious over Schwan in view of Lee.
- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 5, 6, 14, and 15 of the '655 Patent are obvious over Schwan, in view of Lee, and further in view of Strickland.
- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 1, 7-9, 11, 16, 18, and 19 of the '655 Patent are anticipated by Li.
- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 1, 7-11, and 16-19 of the '655 Patent are obvious over Li in view of Rose.
- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 2-4, 12, and 13 of the '655 Patent are obvious over Li, in view of Rose, and further in view of Schwan.

- Based upon my knowledge and experience and my review of the prior art publications listed above, I believe that claims 5, 6, 14, and 15 of the '655 Patent are obvious over Li, in view of Rose, and further in view of Strickland.

VII. INTERPRETATIONS OF THE '655 PATENT CLAIMS AT ISSUE

34. For purposes of my analysis in this IPR proceeding, I understand that the terms that appear in the claims of the '655 Patent should be interpreted according to their ordinary and customary meaning under the *Phillips* standard. In determining the ordinary and customary meaning, I understand that the words of a claim are first given their plain meaning that those words would have had to a POSITA at the time of the alleged invention. I also understand that the structure of the claims, the specification and file history also may be used to better construe a claim insofar as the plain meaning of the claims cannot be understood. Moreover, I understand that even treatises and dictionaries may be used, albeit under limited circumstances, to determine the meaning attributed by a POSITA to a claim term at the time of filing.

35. I also understand that under the *Phillips* standard, when the specification uses “lexicography” to give a special definition to a claim term that differs from the meaning it would otherwise possess, this lexicography governs. Based on my review of '655 Patent, it appears that the term “link data” is subject to such lexicography. EX1001, 4:53-57 (“link data 49 refers to...”). This lexicography

for “link data” does not impact my analysis for Grounds 1A-2D below because the analysis and prior art mapping therein align with the preferred embodiment of the ’655 patent and apply regardless of whether applicant’s lexicography for “link data” adopted. *Infra*, §VIII.

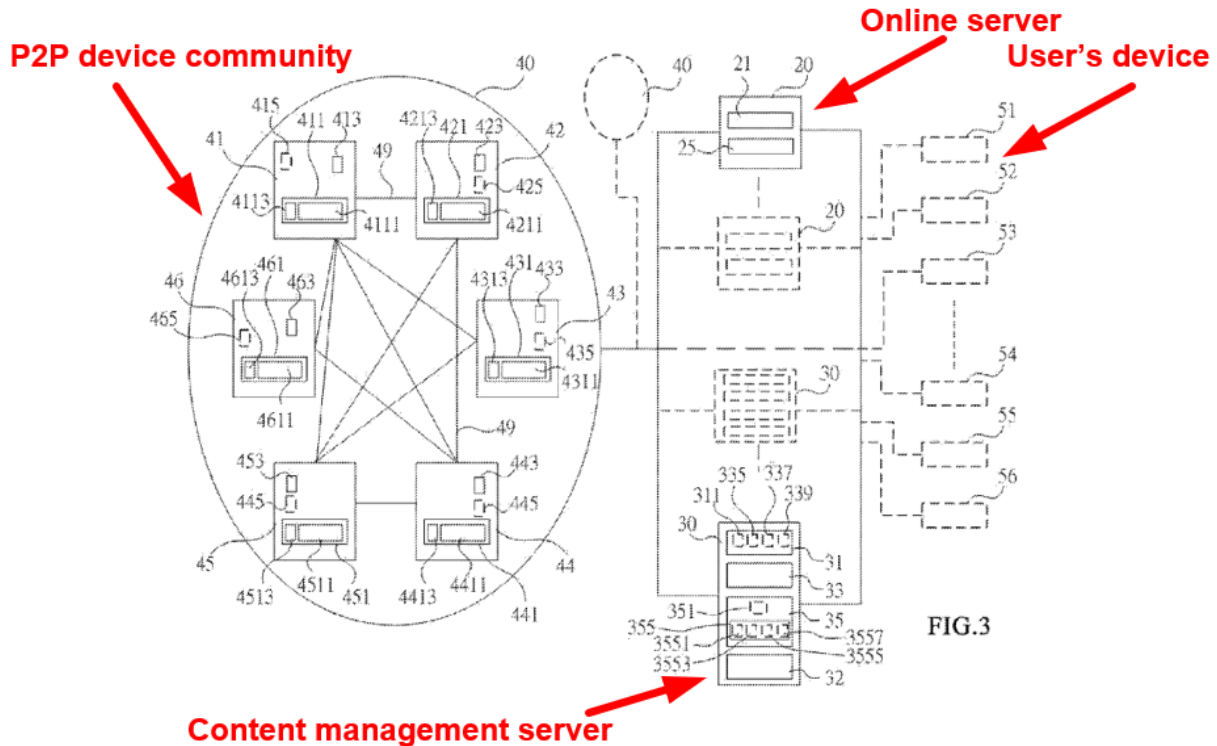
36. I have followed this approach in interpreting terms of the Challenged Claims herein. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA as of the effective filing date of the Challenged Claims (not today). For purposes of my analysis here, I have interpreted the terms of the Challenged Claims from the perspective of a POSITA as of the Oct. 3, 2014 priority date of the ’655 Patent.

VIII. THE ’655 PATENT

A. Overview of the ’655 Patent

37. The ’655 Patent describes a peer-to-peer (P2P) system for managing content downloads from a P2P device community. EX1001, 1:56-3:60, 4:26-6:40, FIG. 2, FIG. 3. The P2P device community described by the ’655 Patent includes a network of P2P devices connected to each other through a web of links. EX1001, 4:35-5:22. The P2P system includes an online server 20 that maintains a topology data table 21. EX1001, 4:51-5:22, 8:41-61, FIG. 3. This topology data table 21 records link data indicating each link between P2P devices. EX1001, 1:65-2:2, 4:51-5:22, 8:41-61, FIGs. 3, 6, 7. The P2P devices store content that is available for

download by other devices. EX1001, 5:23-34, 5:38-6:16, FIG. 2, FIG. 3. Content management server 30 indexes this content in an index database 33. EX1001, 4:58-5:34, 6:17-40, FIG. 2, FIG. 3. The content management server 30 can be different from the online server 20. *Id.*



EX1001, FIG. 3 (annotated)

38. According to the '655 Patent, content management server 30 receives a search request from a user's device, the search request indicating content for download. EX1001, 1:60-2:13, 5:1-22, 6:17-40, FIG. 2, FIG. 3. The '655 Patent describes one embodiment where the content management server 30 searches the index database 33 based on the search request to generate a search result indicating one or more P2P devices storing the requested content. EX1001, 5:50-6:52, FIG. 3.

The content management server 30 sorts the entries of the search result using the topology data table 21 stored by the online server 20. EX1001, 5:50-6:52, FIG. 3.

B. Prosecution History of the '655 Patent

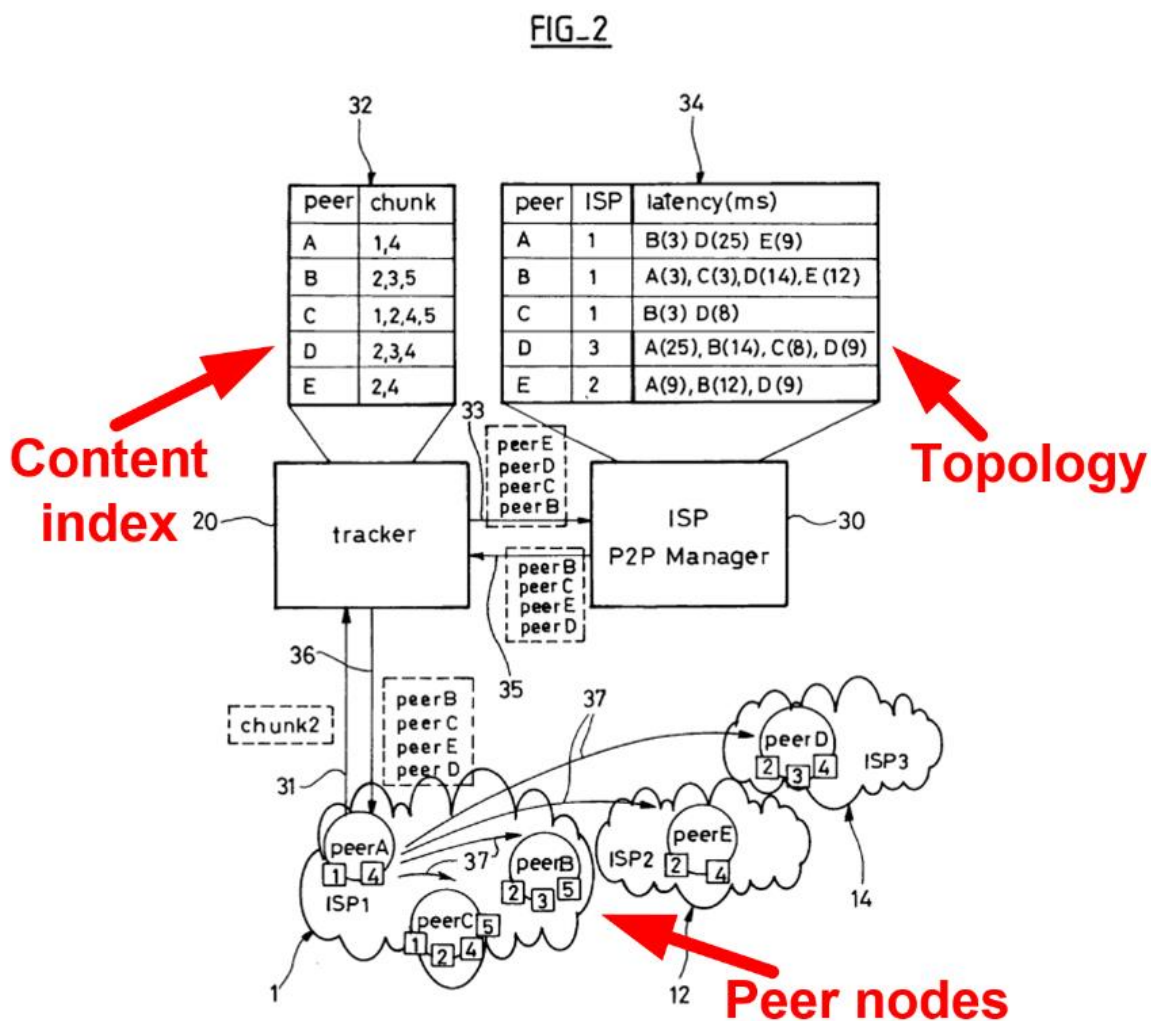
39. In my review of the prosecution history of the '655 Patent, the Examiner issued just one office action including a prior art rejection. EX1002, 80-92. The applicant responded to the office action with (i) an amendment clarifying that each P2P device includes “at least one file data” comprising “a content data and an indexed data,” and (ii) a recitation of intended use of “the user’s device” for externally interacting with the claimed “searching system.” EX1002, 114-133 (adding the recitation of intended use where the user’s device “obtains the link data of the P2P device...according to the topology data table of the online server and the search result”). The Examiner allowed the claims following this response. EX1002, 151-153. As I describe in more detail below (*Infra*, §§IX-X), the claims should not have been allowed because more pertinent prior art was not disclosed to the Examiner.

IX. OVERVIEW AND COMBINATIONS OF PRIOR ART REFERENCES

A. Overview of Schwan

40. Schwan describes a P2P system that tracks P2P devices within a P2P device community and facilitates content downloads from these P2P devices, much like the P2P system of the '655 Patent. EX1004, [0002]-[0006], [0023]-[0039], FIG. 1, FIG. 2. One embodiment disclosed by Schwan involves a P2P system that includes

a plurality of “peer nodes A to E” that “form a peer-to-peer network.” EX1004, [0024]-[0030], FIG. 1. The peer nodes store content that can be downloaded by other devices . EX1004, [0025] (“[e]ach of the peer nodes A to E may hold resources such as applications, services or files that another node may wish to use or retrieve”), *see also id.*, [0029], [0030], FIG. 1, FIG. 2. Schwan’s P2P system includes a tracker node 20 that indexes this content in a table 32 that identifies content stored by each peer node.



EX1004, FIG. 2 (annotated).

41. Schwan's P2P system also includes a peer-to-peer manager 30 that stores a table 34 that provides a topology of the P2P network. EX1004, [0034]. This table 34 indicates a latency between the peer node and each other peer node and an internet service provider (ISP) corresponding to each peer node for each of peer nodes A-E. *Id.* Tracker node 20 and peer-to-peer manager 30 work together to fulfill requests for resources stored by the peer nodes. EX1004, [0026], [0029], [0030], [0032], [0033], FIG. 2.

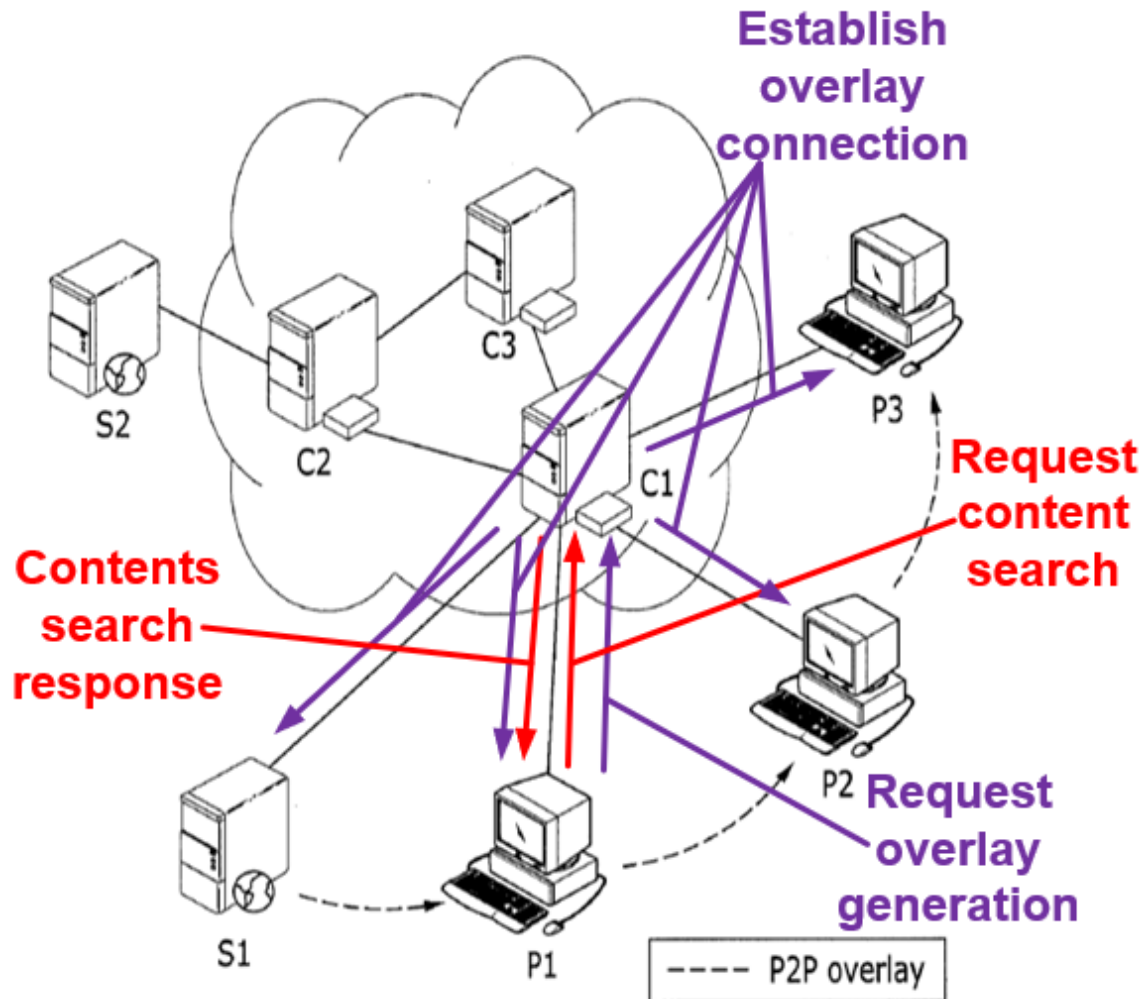
42. Schwan discloses that "peer node A sends a request to the tracker for a peer list of active peers holding the resource 'chunk 2.'" EX1004, [0029]. After peer node A sends the request, tracker node 20 receives the request, "generates an initial list of peer nodes that hold the requested resource" that is "stored in...a table 32," and "sends this initial list to the peer-to-peer manager 30." EX1004, [0029], [0030]. To refine this initial list, peer-to-peer manager 30 "uses...topology information and specific rules to rank the peer nodes of the initial list." *Id.* Next, the peer-to-peer manager 30 "returns the ranked list to the tracker node 20." *Id.* After receiving the ranked list, tracker node 20 "returns the ranked peer list to the requesting peer node A." EX1004, [0032]. When peer node A receives the ranked list of peer nodes, "[t]hen peer node A can contact the peer nodes accordingly." EX1004, [0032], FIG. 2. Schwan therefore discloses techniques for performing an initial search of a content index and using a topology data table to refine the search

that are strikingly similar to the searching and sorting techniques described by the '655 Patent. EX1004, [0028]-[0032], FIG. 2; *cf.* EX1001, 5:38-7:64, FIG. 3.

B. Overview of Lee

43. Lee describes a P2P system that includes contents servers that share data over the P2P network and P2P control device (C1) that manages content downloads by peers from the contents servers. EX1005, [0038]-[0094], FIGS. 2-8. Lee describes one embodiment involving a peer (P1) that outputs, to P2P control device C1, a request for a contents search. EX1005, [0040], [0042], [0052], [0076], [0077], FIG. 2, FIG. 3, FIG. 6. the P2P control device C1 “searches for an appropriate version of contents...with respect to a corresponding type of contents selected by the peer P1” based on this request. EX1005, [0042], [0052], [0077], *see also id.*, FIG. 3. Next, the P2P control device “transfers the information regarding the searched version of contents to the peer P1” and “selects the contents server S1 for providing the corresponding version of contents.” *Id.*

FIG. 2



EX1005, FIG. 2 (annotated).

44. Any of the peers P1-P3 can output a request for C1 to generate an overlay over which the requesting peer can receive the contents after searching for contents. EX1005, [0034]-[0036], [0043], [0044], [0054], [0089]-[0094], FIG. 2, FIG. 3, FIG. 8. Specifically, Lee explains that C1 is configured to “generate a P2P overlay according to a request from the peer P1, and transfers information regarding

a connection to parent and child nodes corresponding to the P2P overlay to the peer P1.” EX1005, [0054], *see also id.*, [0043], [0091]. Lee explains that the overlay is generated based on “information regarding the network” including “a network topology, a maximum bandwidth, a current network usage, a transmission delay time, and the like.” *Id.*

C. Combination of Schwan-Lee

45. It is clear that even if Schwan does not expressly disclose a user’s device that obtains link data for connecting to a P2P device based on a search result and a topology data table, Lee suggests this feature was commonly implemented to achieve several benefits. EX1005, [0038]-[0094], FIGS. 2-8; *supra*, §IX.B. Lee explains that a peer (e.g., any of P1-P3) outputs a request for C1 to search for contents. EX1005, [0042], [0052], [0077]. The peer receives a search result from C1 including a contents identifier. *Id.* Next, the peer requests an overlay and C1 provides link data for the peer to receive the contents via the overlay using the contents identifier from this search result. EX1005, [0043], [0054], [0091]. It is clear that multiple reasons would have prompted a POSITA to implement the P2P system of Schwan with Lee’s suggestions for providing link data to generate an overlay for delivering contents requested by a user’s device.

46. As a first reason, a POSITA would have understood that it would predictably provide a simple and secure way for a user’s device to receive content

through a P2P network by generating an overlay based on topology information and implementing the overlay by outputting link data. Schwan acknowledges that when a P2P network overlay is generated without regard for network infrastructure, this can result in connections between P2P devices that span network borders and result in inefficient transmission. EX1004, [0002]-[0004]. A POSITA would have recognized that one way to address this problem of inefficient connections acknowledged by Schwan would be to implement Lee's solution for generating an overlay based on analyzing network information including network topology and transmission delay time and outputting link data to implement the overlay.

47. As a second reason, it is clear that a POSITA would have been prompted to implement Schwan's P2P system with Lee's suggestions for establishing overlays including multiple hops to allow a P2P device to obtain resources from another P2P device even in cases where the P2P devices cannot connect over a direct link. The resulting system would connect devices over multiple hops in a way that does not result in unnecessary connections which slow transmission time or needlessly consume resources because Schwan explains that these multi-hop overlays can be generated to account for network topology.

48. As a third reason, a POSITA would have been motivated to implement Schwan's P2P system with Lee's overlay suggestions to maintain efficient connections over time because Lee describes techniques for changing an overlay in

response to changing network characteristics. When network conditions such as topology, bandwidth, and transmission delay times change over time, it is clear that the most optimal route for a P2P device to receive content can also change. It is apparent, therefore, that it is beneficial to update the network overlay based on changing conditions as suggested by Lee.

49. a POSITA would have found it obvious to implement Schwan's P2P system with the teachings of Lee for generating an overlay because this would represent one of a finite number of predictable solutions for allowing P2P devices to receive content over a P2P network. A POSITA would have reasonably expected success implementing the Schwan-Lee combination because P2P networks and P2P management servers for searching content were well known before the Critical Date of the '655 Patent.

D. Overview of Strickland

50. Strickland describes a P2P service provider that manages file sharing between P2P devices by facilitating monetary transactions for file sharing between P2P devices. EX1006, [0050]-[0094], [0098]-[0106], FIG. 1, FIG. 2. Strickland explains that in the P2P system, "user 1" sends a search query to a P2P server. EX1006, [0099]. Next, the P2P server searches a database for matches to the search query. *Id.* The P2P server sends a search result to the user 1 including the identified matches when at least one match is identified. *Id.* It is apparent that user 1 has the

option to select one of the identified matches to download. *Id.* The P2P server facilitates a transaction for user 1 to download the selected file when the P2P server receives a selection of a particular file (i.e., File A hosted by “user 2”). EX1006, [0099]-[0101], [0105], [0106], FIG. 2.

51. In one embodiment, Strickland’s P2P server facilitates a “direct” transaction where user 1 is charged a direct monetary amount to download File A and user 2 is credited a direct monetary amount for providing File A. EX1006, [0042], [0092], [0100], [0101], FIG. 2. In another embodiment, Strickland’s P2P server facilitates “indirect” transactions where a user pre-pays for credits that are later debited when the user downloads a file, provided that the user possesses enough credits. EX1006, [0042], [0092], [0100], [0105], [0106], FIG. 2. Both of these embodiments involve the P2P server ensuring that the downloading user (e.g., user 1) is charged before the file download is authorized. EX1006, [0098]-[0106], FIG. 2.

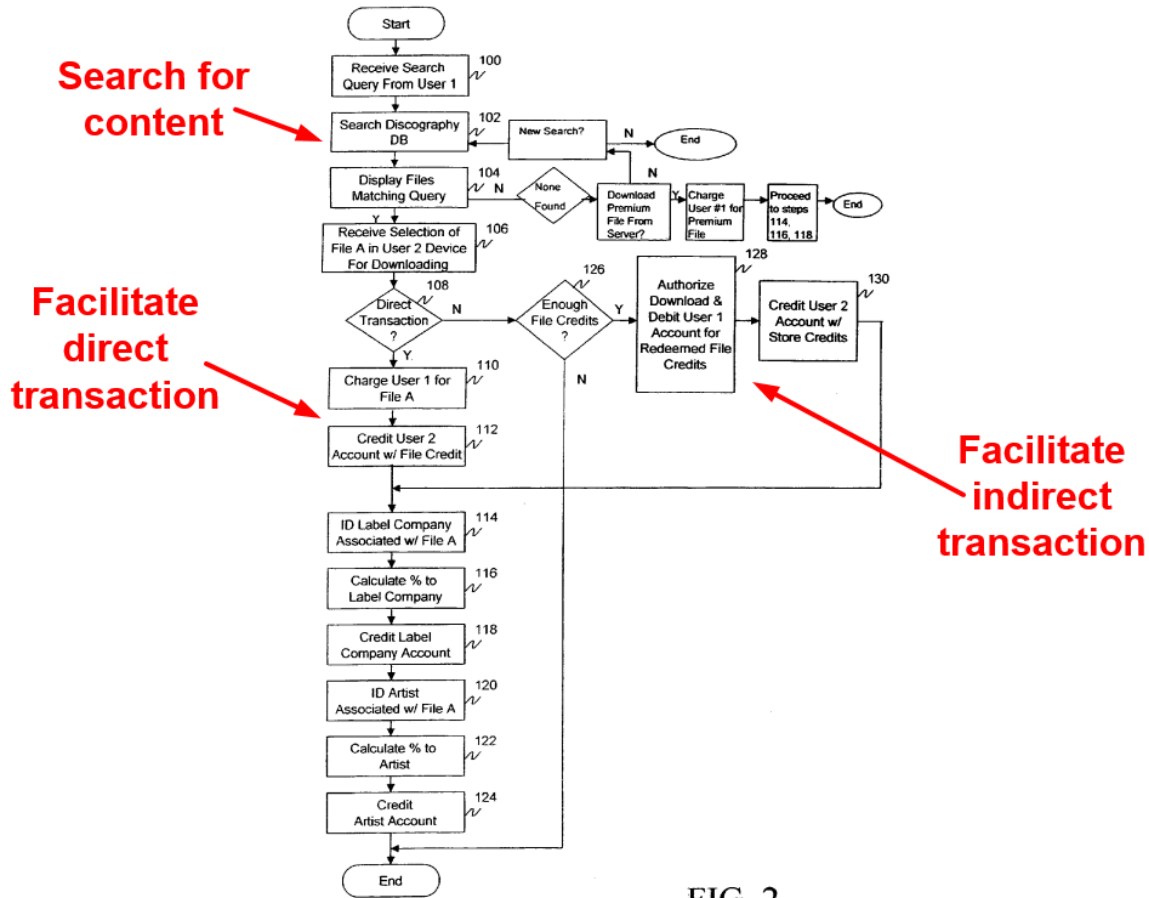


FIG. 2

EX1006, FIG. 2 (annotated).

E. Combination of Schwan-Lee-Strickland

52. The Schwan-Lee combination provides a P2P system including a content management server that receives a search request from a user's device, performs a content search based on an index database and a topology data table stored by an online server, and provides a search result to the user's device. EX1004, [0023]-[0039], FIG. 1, FIG. 2; EX1005, [0038]-[0055], FIG. 2, FIG. 3; *supra*, §IX.B. The Schwan-Lee combination does not describe any techniques for confirming that a requesting user's device has been charged before providing search results or link

data. However, Strickland demonstrates that these features were well known before the Critical Date of the '655 Patent as demonstrated by Strickland, as I discussed above in my overview of Strickland (§IX.D). It is clear that multiple reasons would have prompted a POSITA to apply Strickland's suggestion for charging a requesting device before advancing a content download to the P2P system of the Schwan-Lee combination.

53. As a first reason, a POSITA would have been motivated to implement the P2P system of the Schwan-Lee combination with Strickland's suggestion for facilitating monetary transactions, because doing so would provide a convenient way to charge users for downloading content and reward users for providing content in the P2P network. Because some content that is shared on P2P networks is commercially valuable, a POSITA would have recognized that facilitating transactions for downloads is beneficial for compensating the appropriate parties.

54. As a second reason, a POSITA would have recognized that facilitating at least two different kinds of transactions as suggested by Strickland including direct monetary transactions and indirect transactions involving pre-purchased tokens would result in a flexible system that allows users to acquire downloads conveniently as needed. This would allow frequent downloaders to pre-purchase tokens in bulk ahead of time so that each subsequent download is more time efficient,

and infrequent downloaders can purchase downloads as needed at the individual download cost.

55. As a third reason, because media content is often subject to copyright ownership interests, a POSITA would have been motivated to implement the P2P system with Strickland's suggestion for rewarding copyright owners with a share of the download purchase price. This would ensure that copyright owners are compensated for their rightful share of each download, while facilitating a marketplace where downloaders and providers can exchange files for money.

56. Finally, the Schwan-Lee combination and Strickland both involve P2P systems that facilitate content downloads in a P2P network. In this context, it is clear that a POSITA would have possessed ample skill to successfully implement the combination. It is clear that a POSITA would have reasonably expected success achieving the combination before the Critical Date based upon the predictable electrical components and software involved in the combination and the state of the art at the time.

F. Overview of Li

57. Li explains that a P2P system can determine the most optimal path for a P2P node to receive a resource over a P2P network. EX1007, 4-11, 14-18. Li describes the P2P system of Li as including "aggregation switches, access switches, cell switches, and building switches" that are connected together to define a

metropolitan area network. EX1007, 9, *see also id.*, 2-8 10-18, FIG. 1, FIG. 4. To access resources stored in other parts of the network, “P2P computers” of the metropolitan area network connect to the switches. EX1007, 9, *see also id.*, 8-10, 17, FIG. 1, FIG. 4. Li explains that each node in the metropolitan area network is associated with a level depending on the type of switch (e.g., s1 for aggregation switches, s2 for access switches), and a number associated with the level. EX1007, 9, 14, FIG. 4. The system of Li uses these levels and numbers to identify a location of nodes within the metropolitan area network. EX1007, 9 (“each subnet or building switch can be represented by a vector $S = (s1, s2, s3, s4)$, which is also a common location vector of the computers under this switch.”), *see also id.*, 15, 16, FIG. 4.

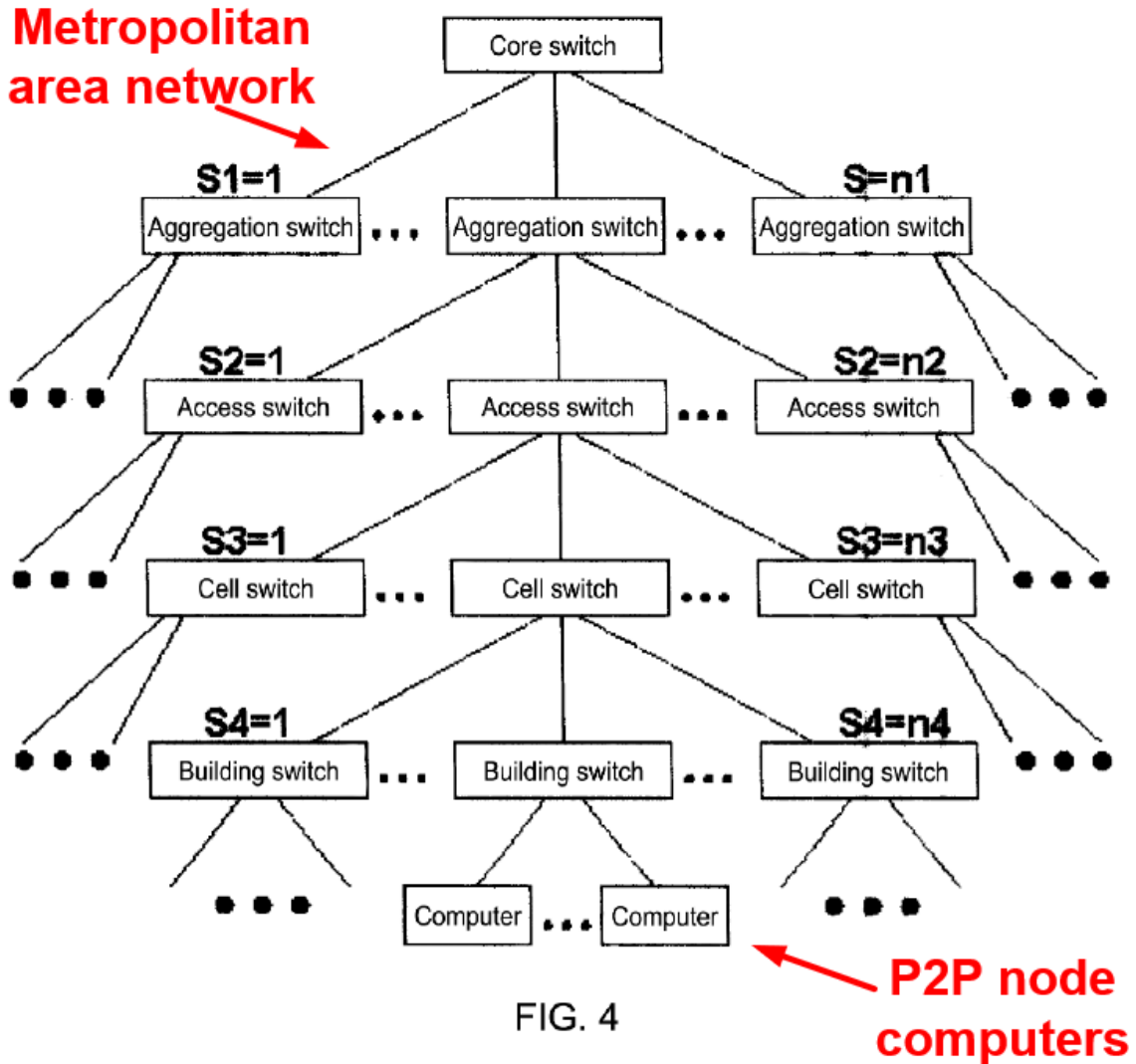


FIG. 4

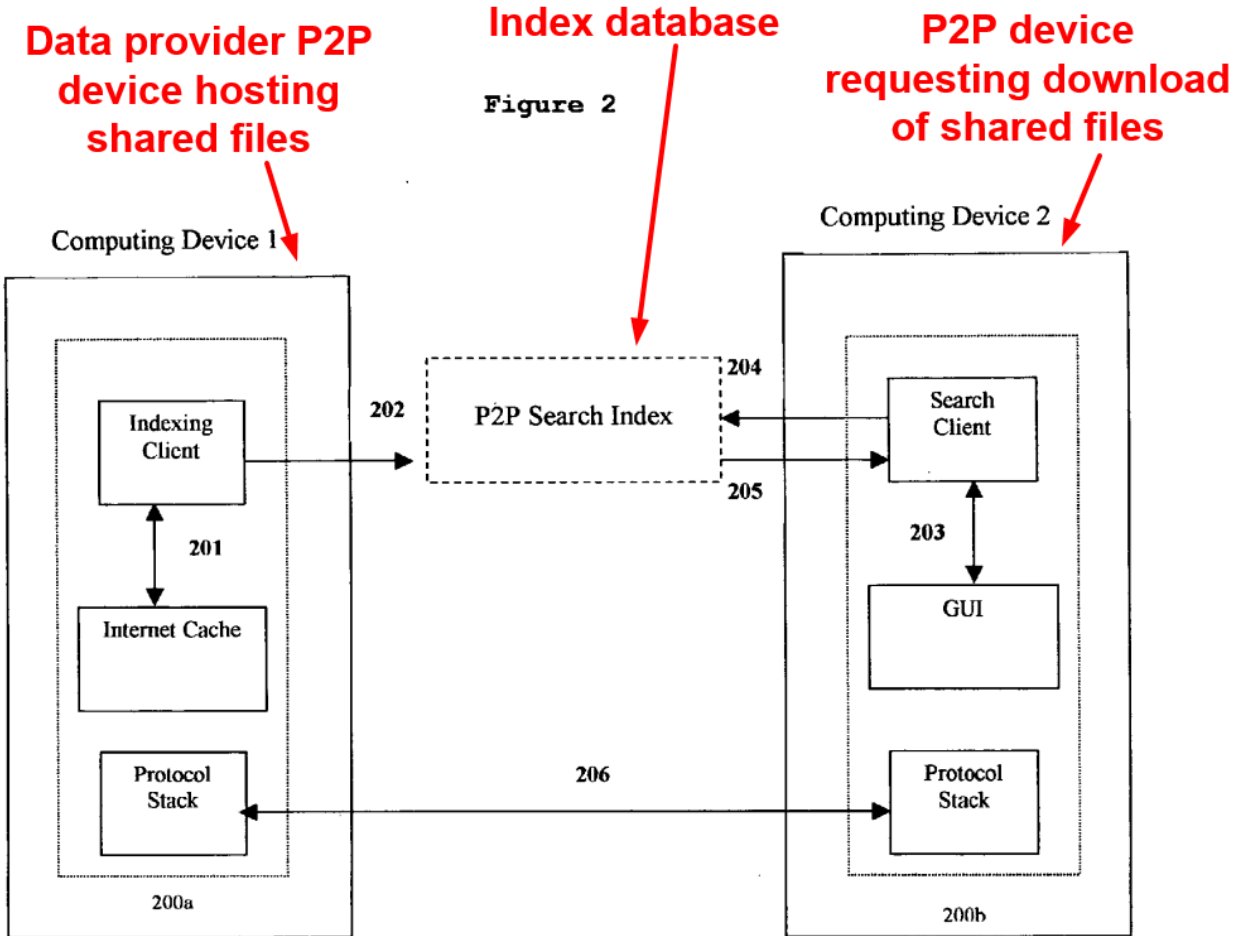
EX1007, FIG. 2 (annotated).

58. Li explains that “a topology server and a P2P index server are added in the metropolitan area network,” much like the ’655 Patent describes separate content management and online servers. EX1007, 14, *see also id.*, 5, 7, 8, 10, 11, 16, 17, FIG. 4. The P2P index server receives a “query request” from a “requesting P2P node” including a request to download a “certain resource” in the metropolitan area network of Li. EX1007, 11, *see also id.*, 14, 15, 17. The P2P index server next

performs querying to identify “resource P2P nodes” that store the resource. *Id.* Li describes one embodiment where the P2P index server sends “the list of the resource P2P nodes to the requesting P2P node.” *Id.* In another embodiment, the P2P index server sends “the IP address of the requesting P2P node and the IP address of each obtained resource P2P node to the topology server” which calculates “one or more nearest neighbor resource P2P nodes” and returns the list of nearest neighbor resource P2P nodes to the requesting P2P node via the index server. *Id.*

G. Overview of Rose

59. Rose describes a system for “indexing and searching content” in a “distributed computing network.” EX1008, [0024], [0029], *see also id.*, [0003]-[0014], [0051]-[0061], FIGS. 1-4. Rose expressly describes the distributed computing network as a “P2P network.” *Id.* In one embodiment, Rose’s P2P network includes a “computing device 1” that creates entries for a “comprehensive index of data.” EX1008, [0040], FIG. 2. Rose also describes a “computing device 2” that searches the index for a requested file. *Id.* Rose explains that the search index “searches the index for...links matching the search criteria” and “returns...the appropriate search response” to computing device 1. EX1008, [0040], FIG. 2. Computing device 2 communicates with computing device 1 download the requested file based on this search response. EX1008, [0040], FIG. 2.



EX1008, FIG. 2 (annotated).

H. Combination of Li-Rose

60. It is apparent that Rose provides a content management server that includes a search engine and an index database recording indexed data of each P2P device of a P2P device community, even if Li does not provide these features. EX1008, [0051]-[0071], FIGS. 3-5. Rose discloses that a central server can generate an index database that is shared with a distributed search engine (DSE) client, the index database indicating shared files that are hosted by data providers. *Id.* It is clear

that multiple reasons would have prompted a POSITA to implement the P2P system of Li with Rose's suggestion for a content management server to maintain an index database that indicates files offered by each data provider P2P node.

61. As a first reason, a POSITA would have recognized that a P2P index server would accurately identify P2P devices that store resources in response to receiving a query identifying the resource by implementing Li's P2P index server to actively maintain an index database as suggested by Rose. For example, Rose explains that a central server "maintains a downloadable data index, which is periodically updated" to reflect changes in the status of shared files over time. EX1008, [0052]. Causing Li's P2P index server to create and periodically update an index as described by Rose would therefore result in the P2P index server obtaining a list of P2P nodes that currently have the requested resource, accounting for any updates to shared files.

62. As a second reason, a POSITA would have understood that implementing Li's P2P system to use more than one distributed search engine (DSE) client to handle search requests from P2P devices, as suggested by Rose, would prevent a single search engine from handling every single search request in the P2P network, therefore increasing a likelihood that the P2P system can handle a large number of search requests in a short amount of time. For example, Li acknowledges that "P2P technology preemptively applies...network bandwidth...seriously

affecting the normal operation of other services.” EX1007, 1. Using more than one distributed search engine (DSE) client to handle search requests would address the bandwidth issue acknowledged by Li while distributing the burden of handling these search requests.

63. As a third reason, a POSITA would have been motivated to provide the requesting P2P node with information useful for connecting to the one or more P2P devices having the requested resource by causing Li’s P2P index server to output a search result including an IP address of one or more P2P devices having a requested resource, as suggested by Rose. For example, the requesting P2P node can use the IP address to connect to a resource P2P node over the network to conveniently download the resource.

64. Finally, it is clear that it would have been obvious for a POSITA to implement Li’s P2P system with the teachings of Rose for maintaining an index database because doing so represents one of a finite number of predictable solutions for allowing P2P devices to receive content over a P2P network. A POSITA would have reasonably expected success implementing the Li-Rose combination because P2P networks and content management servers for managing content search requests from P2P devices were well known before the Critical Date of the ’655 Patent.

I. Combination of Li-Rose-Schwan

65. The “P2P index server” described by Li obtains a list of P2P nodes having a requested resource and a “topology server” that determines “nearest neighbor” P2P nodes based on a topology data table. EX1007, 4-11, 14-17, FIG. 1, FIG. 4, FIG. 5. It would have been obvious and provided in the Li-Rose-Schwan combination to implement the P2P index server with a sorting algorithm module for creating weighted data based on link data stored in a topology data table of the P2P index server even if Li does not expressly disclose such features. EX1004, [0024]-[0036], FIG. 1, FIG. 2. It is apparent that multiple reasons would have prompted a POSITA to implement the P2P system of the Li-Rose combination with Schwan’s suggestion to use a content management server to sort search results based on a topology data table stored by an online server.

66. As a first reason, to provide a server that conveniently searches for content and refines the search based on topology data stored on another server, a POSITA would have been motivated to implement the P2P system of the Li-Rose combination so that the P2P index server can determine the nearest neighbor P2P nodes in addition to the topology server. As a second reason, implementing the nearest neighbor analysis of the predictable Li-Rose combination with Schwan’s suggestion to sort search results based on latency would provide another way to prioritize resource P2P nodes that are close to the requesting P2P node within the P2P network. As a third reason, a POSITA would have been motivated to apply

Schwan's content management techniques to the P2P system of the Li-Rose combination to increase a number of P2P devices that can connect because Schwan discloses techniques for managing a P2P device community spread across multiple different ISPs.

67. Finally, a POSITA would have found it obvious to implement the P2P system of the Li-Rose combination with the teachings of Schwan for sorting a search result using a content management server because doing so represents one of a finite number of predictable solutions for managing search requests in a P2P network. A POSITA would have reasonably expected success implementing the Li-Rose-Schwan combination because P2P management servers storing indexed databases and online servers storing topology data tables were well known before the Critical Date of the '655 Patent.

J. Combination of Li-Rose-Strickland

68. A POSITA would have found it obvious and would have been motivated to further modify the content management server of the Li-Rose combination based on Strickland's suggestion to include a user charge module to achieve the first, second, and third known benefits that I articulated above in my analysis of the Schwan-Lee-Strickland combination. *Supra*, § IX.E.

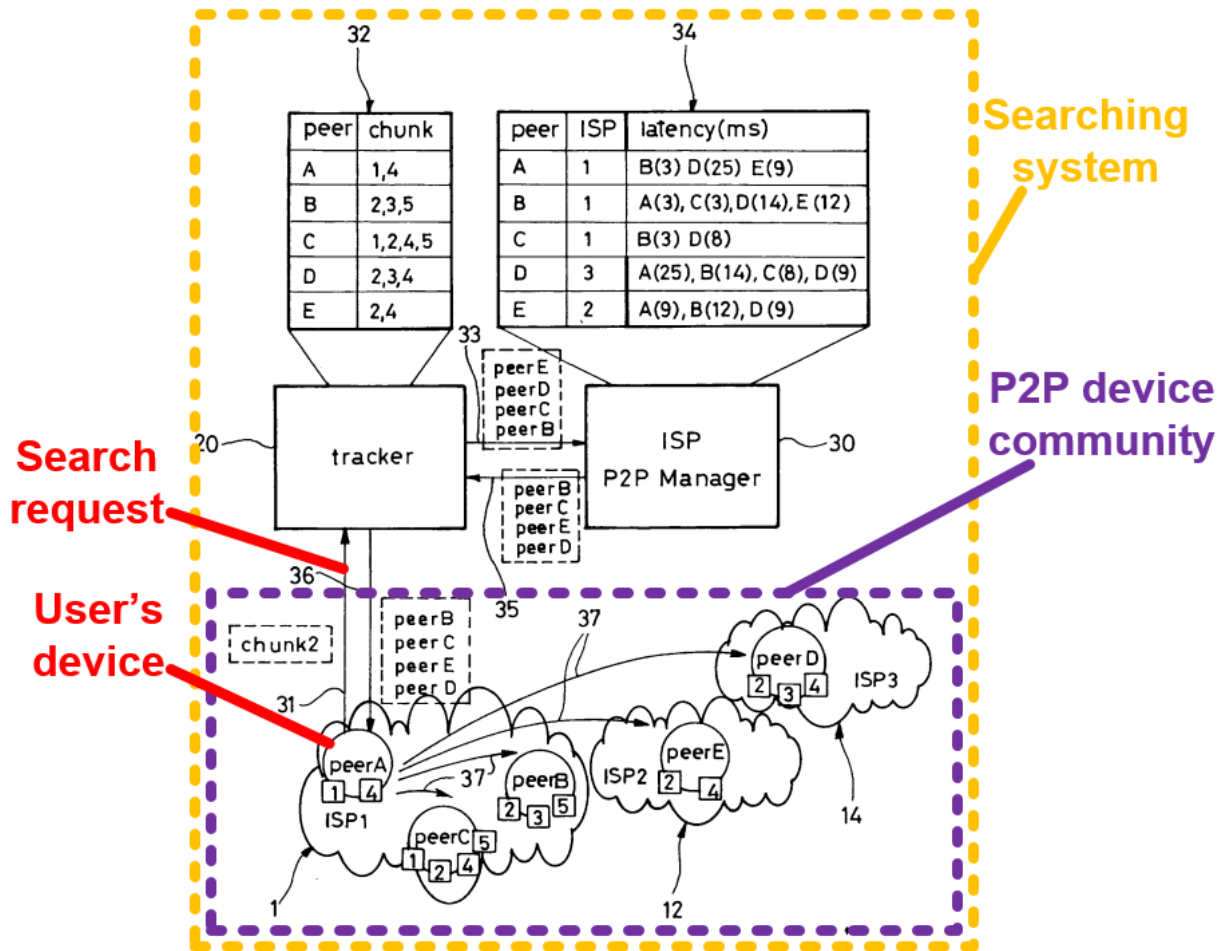
X. MANNER IN WHICH THE PRIOR ART REFERENCES RENDER THE '655 CLAIMS UNPATENTABLE

A. Schwan Anticipates Claims 1-4, 7-9, 11-13, 16, 18, and 19

Element [1pre]: A searching system for a P2P (peer-to-peer) device community, for receiving a search request sent from at least one user's device, the searching system comprising:

69. To the extent the preamble is limiting, Schwan discloses the claimed searching system. Schwan discloses “a system for operating a peer-to-peer network” and that an object of his invention is “to offer differentiated P2P service experiences. EX1004, Claim 1, [0007]. Schwan also discloses a ***P2P device community*** including “peer nodes A to E” that “form a peer-to-peer network.” EX1004, [0024], [0025], *see also id.*, [0007]-[0021], [0023], [0026], [0028]-[0033], FIG. 1, FIG. 2. Schwan makes it clear that tracker node 20, a peer-to-peer manager 30, and the ***P2P device community*** represent a ***searching system***, as I will describe in more detail below. EX1004, [0027]-[0039], FIG. 2.

FIG. 2



EX1004, FIG. 2 (annotated).

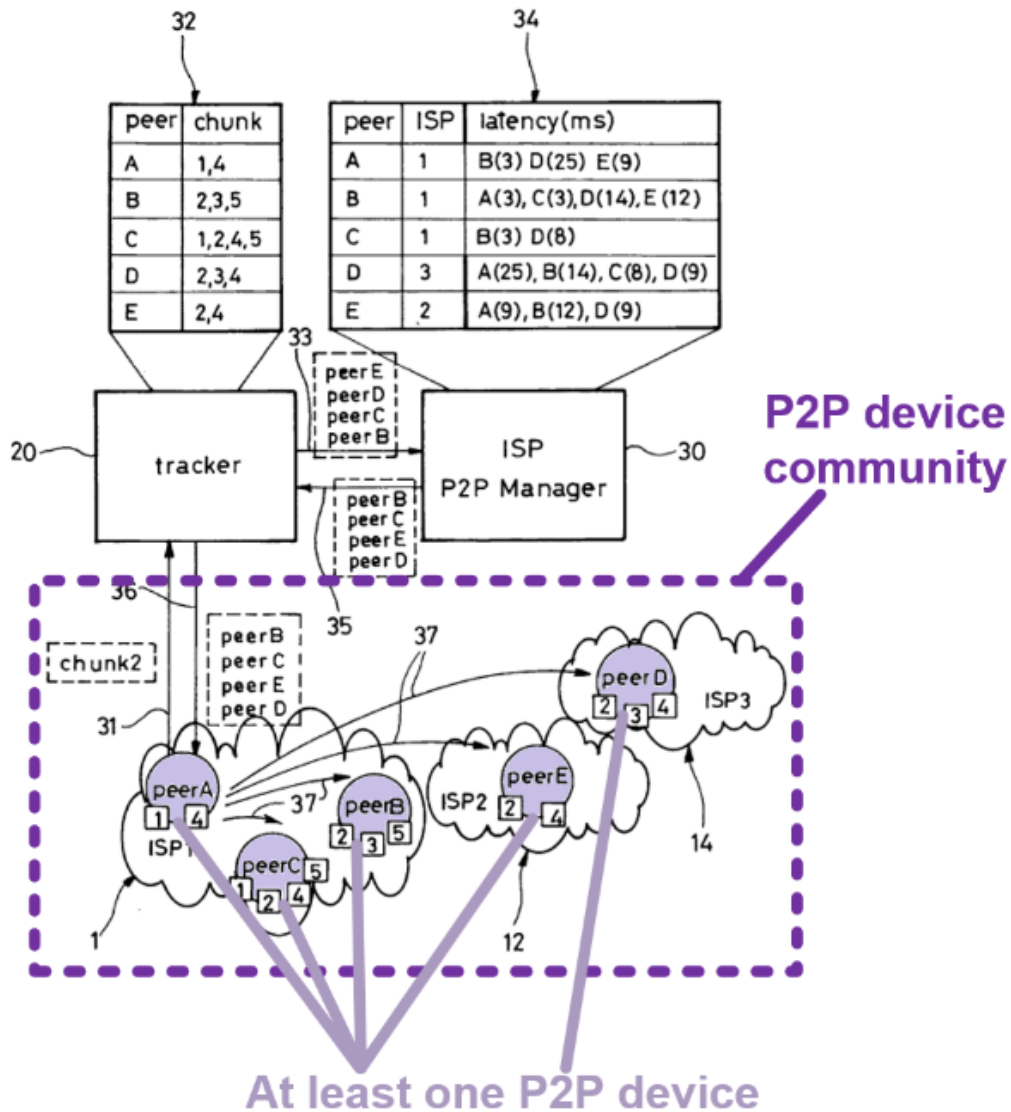
70. Schwan explains that the tracker node 20 receives a **search request** from peer node A. EX1004, [0029] (“peer node A sends a request to the tracker”), [0030] (“[u]pon receiving the request 31”). Schwan describes peer nodes as being user devices for downloading content, which means that peer node A represents **at least one user’s device**. EX1004, [0004] (“[a] user that wants to download a file from a BitTorrent P2P network”), [0024] (describing network devices that host peer

nodes as including “cellular radiotelephones, personal computers, personal digital assistants, set-top boxes, etc.”).

Element [1a]: at least one P2P device community, wherein each the P2P device community includes at least one P2P device, wherein each the P2P device respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

71. As I described above in my analysis of Element [1pre], *supra*, Schwan describes a ***P2P device community*** including “peer nodes A to E” that “form a peer-to-peer network.” EX1004, [0026], *see also id.*, [0023]-[0025], [0029]-[0033], FIG. 1, FIG. 2. Because each of peer nodes A to E hosts content for sharing with other devices, peer nodes A to E represent ***at least one P2P device***. EX1004, [0025] (“each of the peer nodes A to E may hold resources such as applications, services or files that another node may wish to use or retrieve”), *see also id.*, [0024], [0026], [0028]-[0032], FIG. 1, FIG. 2. Schwan also explains that each peer node is hosted by a network ***device***. EX1004, [0024] (“network devices 21 to 25...host respective peer nodes A to E”). Schwan describes these network devices as being devices that commonly serve as peers in P2P networks, including “cellular radiotelephones, personal computers, personal digital assistants, set-top boxes.” EX1004, [0024]; My opinion here is corroborated by multiple references describing P2P devices. EX1010, 1 (describing a set-top box as a device in a P2P network), EX1011 (describing mobile devices as P2P devices)).

FIG. 2



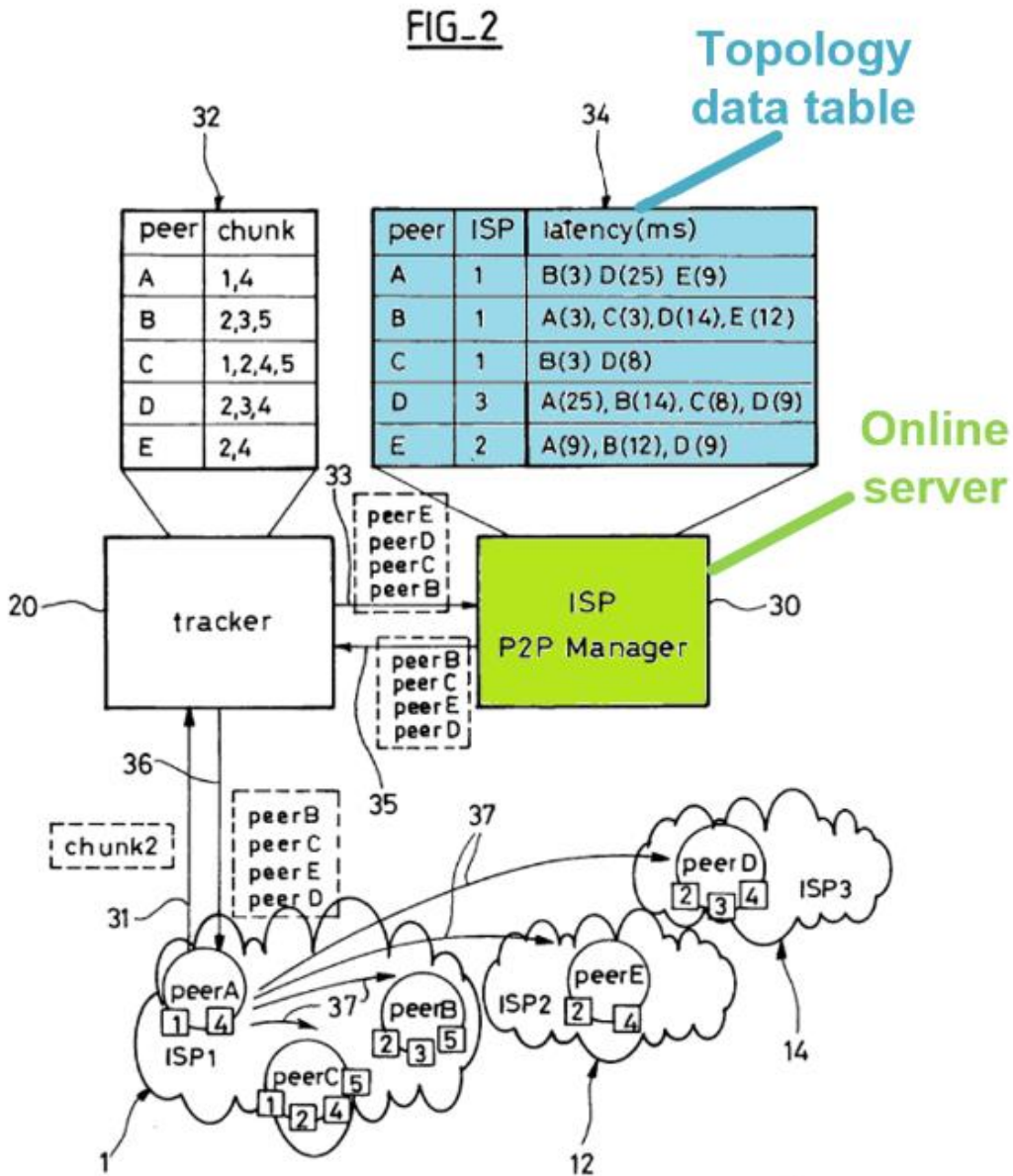
EX1004, FIG. 2 (annotated).

72. The *at least one P2P device* stores *file data* including *content data* because Schwan expressly discloses that “[e]ach of the peer nodes A to E may hold resources such as applications, services or files that another node may wish to use or retrieve.” EX1004, [0024], *see also id.*, [0012] (“peer nodes holding the given

resource”), [0014], [0017], [0019], [0029], [0030]. The **file data** stored by each **P2P device** also comprises **indexed data** such as a file name. EX1004, [0029] (“file called ‘chunck 2’”), see also id., [0024]-[0028], [0030], FIG. 2. Each **P2P device** of Schwan therefore comprises **file data** including **content data** and **indexed data**. *Id.*

Element [1b]: at least one online server connecting to the P2P device community, each the online server includes a topology data table, the topology data table being recorded with a link data between each of the P2P devices of the P2P device community; and

73. The peer-to-peer manager 30 that represents an **online server** in the P2P system of Schwan EX1004, [0027], [0029]-[0031], FIG. 2. Because peer-to-peer manager 30 collects information, such as the latency between each pair of peer nodes from the peer nodes over the P2P network, Schwan’s peer-to-peer manager 30 is **online**. EX1004, [0029], FIG. 2. Peer-to-peer manager 30 represents a **server** because peer-to-peer manager 30 manages information relating to multiple different peer nodes spanning multiple different service providers. EX1004, [0027], [0029]-[0031], FIG. 2. When peer node A sends a request to tracker node 20 which forwards this request to peer-to-peer manager 30 and peer-to-peer manager 30 sends a sorted search result back to peer node A, the **online server** represented by peer-to-peer manager 30 **connects** to the **P2P device community**. EX1004, [0028]-[0032]. FIG. 2. In addition, the **online server** represented by peer-to-peer manager 30 **connects** to the **P2P device community** via tracker node 20 to collect information such as a latency between each pair of peer nodes. EX1004, [0029]-[0031], FIG. 2.



EX1004, FIG. 2 (annotated).

74. The **online server** represented by peer-to-peer manager 30 includes a table 34 that stores, for each of the peer nodes, “an identification of the access network to which the peer node is connected and a distance measurement with other peer nodes,” which Schwan refers to as “topology information.” EX1004, [0029]-

[0031], [0036], [0044], FIG. 2. As an example, Schwan explains that “[t]he access network is identified by the name of the ISP” corresponding to the peer node and “[t]he distance measurement between two peer nodes is expressed as the latency in milliseconds.” *Id.* Table 34 indicates the internet service provider (ISP) corresponding to each peer node of the **P2P device community** and the latency, in milliseconds, between multiple different pairs of peer nodes of the P2P device community. EX1004, [0031], FIG. 2 (depicting 25ms latency between peerA and peerD and 12ms latency between peerB and peerE).

34

Topology data table

Latency between peerA and other P2P devices

peer	ISP	latency (ms)
A	1	B(3) D(25) E(9)
B	1	A(3), C(3), D(14), E(12)
C	1	B(3) D(8)
D	3	A(25), B(14), C(8), D(9)
E	2	A(9), B(12), D(9)

ISP where each peer device is located

EX1004, FIG. 2 (annotated).

75. The **online server** represented by peer-to-peer manager 30 stores a **table** 34 including **topology data** because the **topology** information of table 34 indicates

the ISP where each **P2P device** is located and an amount of latency separating pairs of **P2P devices**. EX1004, [0027]-[0031], FIG. 2. It is apparent that because that the P2P device connects to other P2P devices, the ISP corresponding to each P2P device represents **link data** between **each of the P2P devices**. EX1004, [0030], [0031], FIG. 2. An amount of latency separating each pair of P2P devices clearly represents **link data** between **each of the P2P devices**. EX1004, [0027]-[0031], FIG. 2. One reason for my opinion here is that these latencies indicate the amount of time it takes for information to travel over a link **between** the respective pair of P2P devices, meaning that the latency represents **link data between** the **P2P devices**. EX1004, [0027]-[0031], FIG. 2.

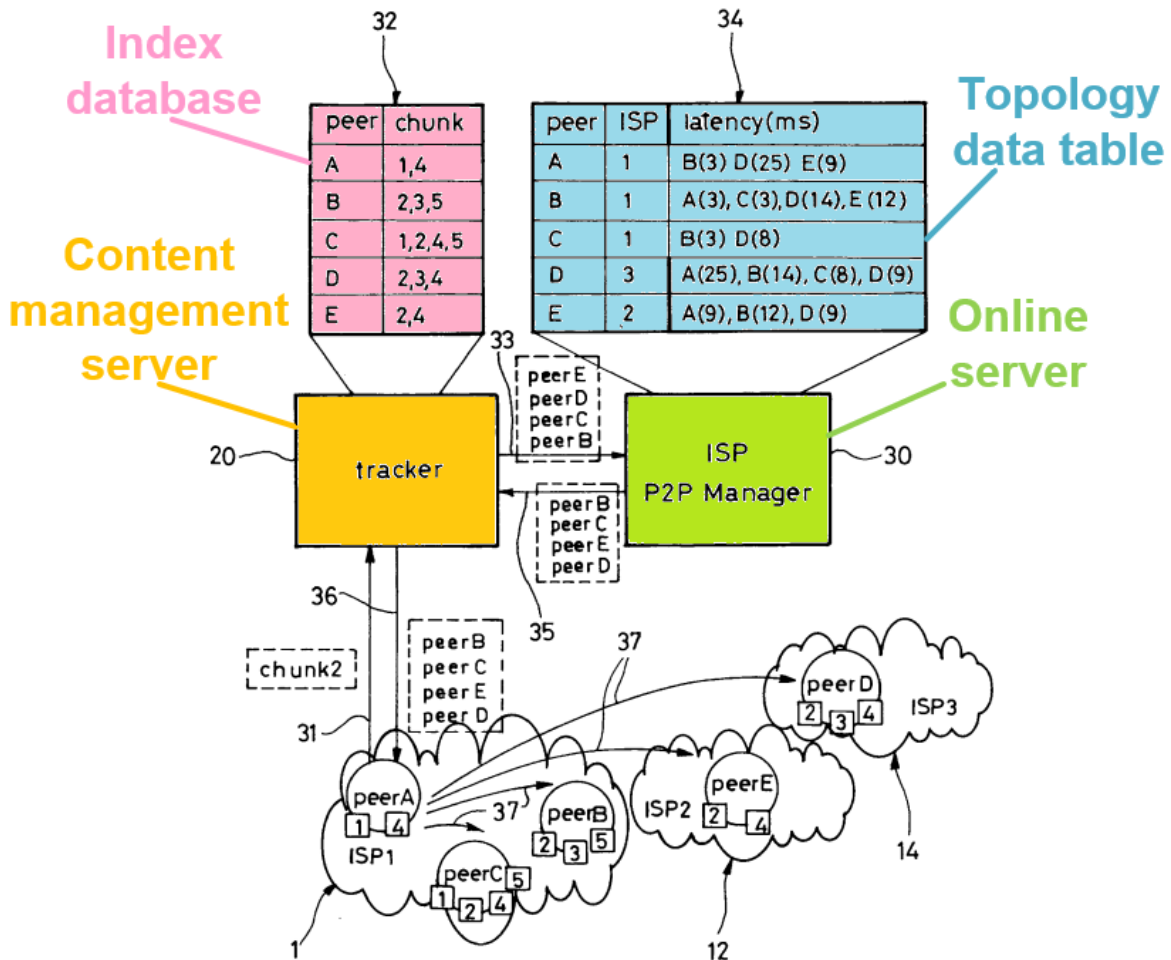
76. The **link data** stored by Schwan's table 34 is very similar to the link data described by the '655 Patent, because in both cases the link data indicates a location of connection and data indicating a connection relationship between one or more pairs of devices. EX1004, [0027]-[0031], FIG. 2; cf. EX1001, 4:51-53 ("[t]he topology data table 21 of the online server 20 is mainly recorded with a link data 49 between each of the P2P devices 41-46 within the P2P device community...link data 49 refers to the connection relationship between the P2P devices 41-46, which includes, but is not limited to, the connection structure, connection data and/or locations of connection"). Therefore, Schwan discloses that the **topology data table**

includes **link data** between **P2P devices** of the **P2P device community**. EX1004, [0027]-[0039], FIG. 2.

Element [1c]: at least one content management server connecting to the P2P device community and the online server respectively, each the content management server includes a search engine, an index database, and a user's device management unit,

77. Because Schwan's tracker node 20 stores a table 32 that indicates **content** stored by each **P2P device** (i.e., each peer node A-E) within the **P2P device community**, it is apparent that Schwan's peer node 20 represents a **content management server** connected to the **P2P device community** and the **online server**. EX1004, [0029], [0030], FIG. 2 (depicting the tracker node 20 communicating with peer node A and P2P manager 30). Schwan describes tracker node 20 as maintaining "a list of the active peers in the peer-to-peer network and the respective resources that they hold." EX1004, [0029]. This information is stored as part of table 32 "in a data repository of the tracker node 20." *Id.*

FIG_2



EX1004, FIG. 2 (annotated).

78. The table 32 stored by Schwan's *content management server* therefore represents an *index database* indicating resources stored by each of peer nodes A-E. EX1004, [0029], [0030], FIG. 2. Resources stored by peer nodes A-E are referred to by Schwan as "chuncks" (or "chunks"). EX1004, [0029], [0030], FIG. 2. Each of these chunks is associated with an index number (e.g., 1, 2, 3, 4, 5). *Id.* The *index*

database of Schwan's *content management server* clearly indicates that peer nodes B-E store "chunck2" and peer nodes B-C store "chunck5," as examples. *Id.*

**Index
database**

32

peer	chunk
A	1,4
B	2,3,5
C	1,2,4,5
D	2,3,4
E	2,4

**Resources
stored by each of
peer nodes A-E**

The diagram shows a table with two columns: 'peer' and 'chunk'. The rows represent peer nodes A through E and the chunks they store. Annotations include a pink arrow pointing to the table from the text 'Index database', a black line with the number '32' pointing to the table header, and red arrows pointing from the text 'Resources stored by each of peer nodes A-E' to the data rows of the table.

EX1004, FIG. 2 (annotated).

79. Schwan explains that "peer node A sends a request to the tracker for a peer list of active peers holding the resource 'chunck 2', as shown by arrow 31" and "[u]pon receiving the request 31, the tracker node 20 generates an initial list of peer nodes that hold the requested resource." EX1004, [0029], [0030] FIG. 2. The *content management server* represented by tracker node 20 searches the *index database* of table 32 which identifies the resources stored by each *P2P device* of the *P2P device community* to generate this initial list. *Id.* Schwan explains, for instance, that the

“the initial list reads E, D, C, and B,” so it is apparent that that the initial list includes each P2P device that stores the “chunck2” resource requested by peer node A. EX1004, [0029], [0030] FIG. 2. It is also apparent that that the **content management server** represented by tracker node 20 includes a **search engine** for searching the **index database** to identify every peer node that stores the “chunck2” resource. *Id.*

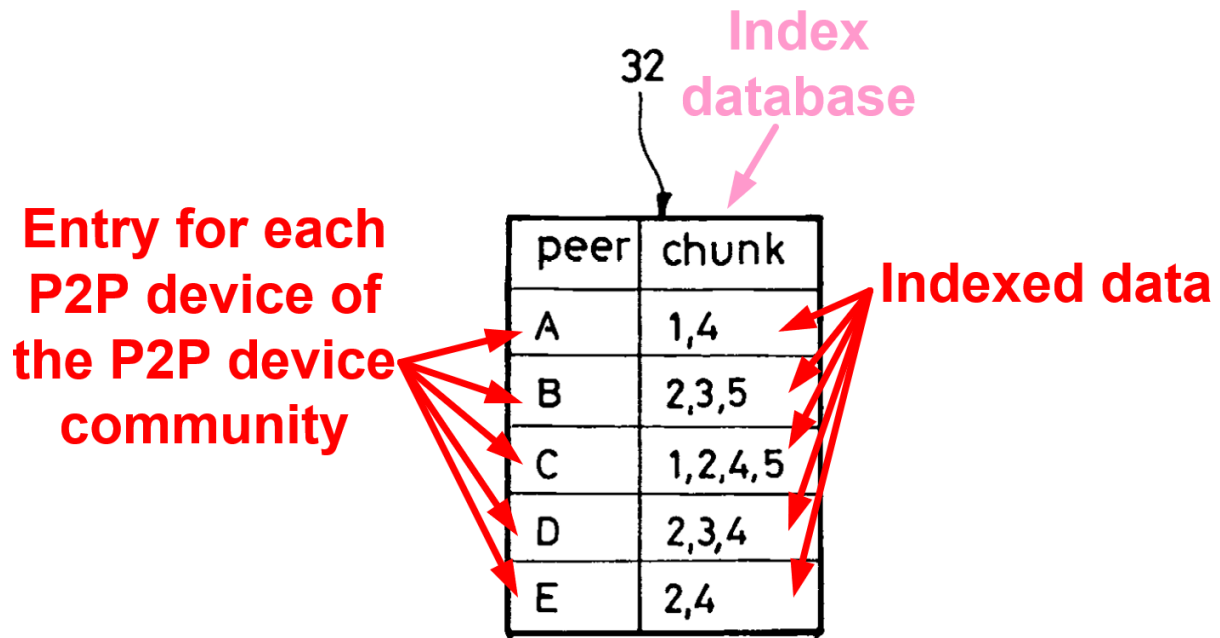
80. Tracker node 20 includes a **user’s device management unit** for connecting to the user’s device represented by peer node A and managing the connection between peer node A and tracker node 20 because Schwan explains that “peer node A sends a request to the tracker for a peer list of active peers holding the resource ‘chunck 2’” and “tracker node 20 finally returns the ranked peer list to the requesting peer node A, as shown by arrow 36.” EX1004, [0029], [0032], FIG. 2. Another reason for my opinion here is that tracker node 20 is strikingly similar to the content management server of the ’655 Patent, which includes a user’s device management unit 35 configured to receive a request from a user’s device and deliver search results to the user’s device based on the search request. EX1004, [0029], [0030], FIG. 2; *cf.* EX1001, 5:1-22, 5:50-6:5, 6:17-40.

81. Consequently, the **content management server** represented by tracker 20 includes a **search engine**, an **index database**, and a **user’s device management unit**. EX1004, [0028]-[0039], FIG. 2. The **content management server** represented by tracker node 20 is configured to connect to the **P2P device community** because

tracker node 20 communicates with peer node A. EX1004, [0029], [0032], FIG. 2. The **content management server** represented by tracker node 20 is configured to connect to the **online server** represented by peer-to-peer manager 30, because tracker node 20 sends the initial list of peer nodes to peer-to-peer manager 30 and subsequently receives a ranked list of peer nodes from peer-to-peer manager 30. EX1004, [0031].

Element [1d]: wherein the index database records the indexed data of each the P2P device of the P2P device community, the user's device management unit receives the search request sent from the user's device, the search engine searches the index database to generate a search result based on the search request and then returning the search result to the user's device,

82. As I described above in my analysis of Element [1c], *supra*, the **content management server** represented by tracker node 20 stores an **index database**—i.e., table 32—including information identifying resources stored by each of the peer nodes A-E. EX1004, [0029], [0030], FIG. 2. This information includes an index number corresponding to each stored resource (e.g., “chunk 2” indicating the same resource stored by peer nodes B-E). *Id.* Each entry in table 32 corresponds to one of the peer nodes A-E, and each entry indicates index numbers for resources stored by the respective one of peer nodes A-E. EX1004, [0029], [0030], FIG. 2. Tracker node 20 includes an **index database** that records **indexed data** including identification numbers (e.g., “chunk 2”) for resources hosted by each **P2P device of the P2P device community** including peer nodes A-E. EX1004, [0029], [0030], FIG. 2.

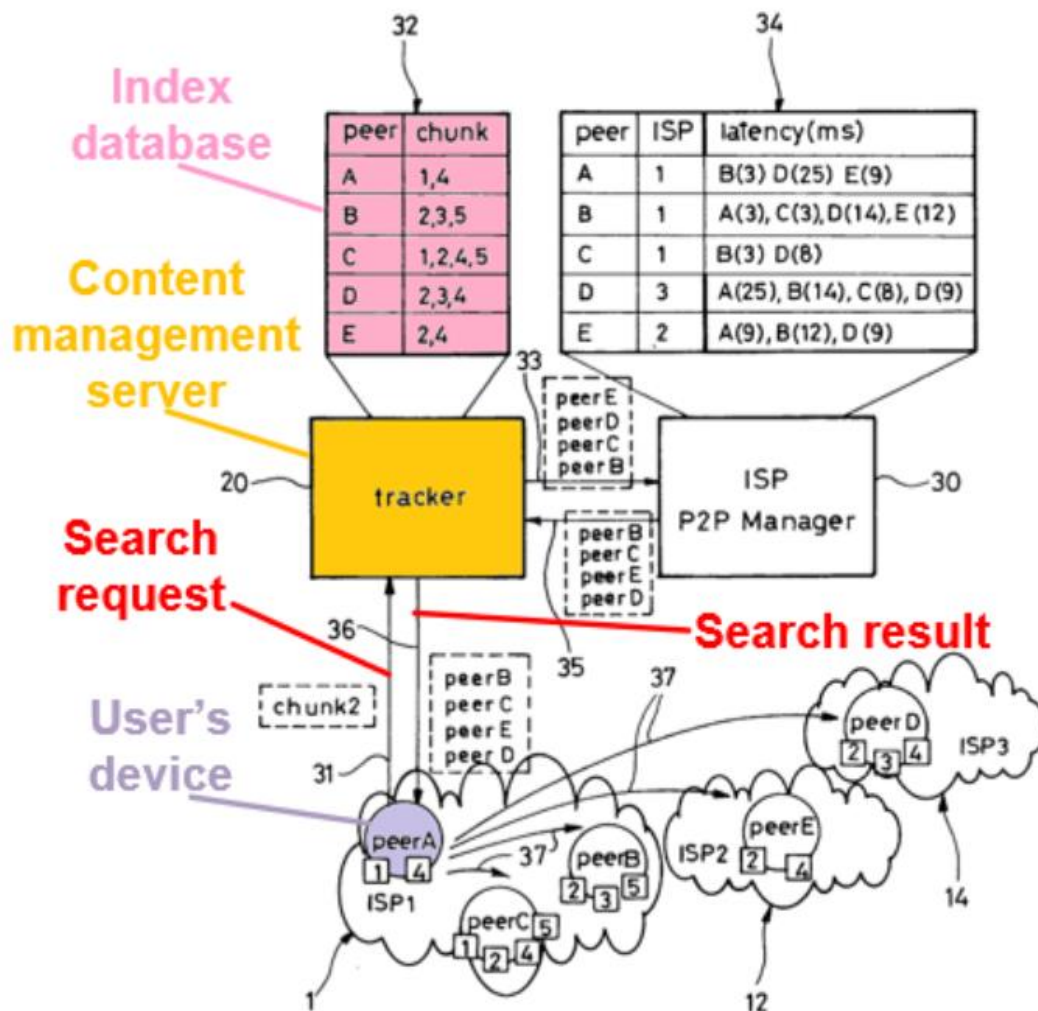


EX1004, FIG. 2 (annotated).

83. It is also apparent that the tracker node 20, Schwan's *content management server*, includes a *user's device management unit* configured to receive a *search request* from the *user's device* represented by peer node A. EX1004, [0029] ("peer node A sends a request to the tracker for a peer list of active peers holding the resource 'chunk 2'"), [0030] ("[u]pon receiving the request 31, the tracker node 20 generates an initial list of peer nodes that hold the requested resource"); *supra*, Element [1c]. The *content management server* also includes a *search engine* that generates a *search result* based on the search request received from peer node A. EX1004, [0029]-[0032], FIG. 2.

84.

FIG. 2



EX1004, FIG. 2 (annotated).

85. It is clear that a **search engine** of Schwan's **content management server** "generates an initial list of peer nodes that hold the requested resource" and "sends this initial list to the peer-to-peer manager 30," because the **search engine** identifies the peer nodes that hold the resource. EX1004, [0030], FIG. 2. Schwan expressly discloses that in one embodiment, peer-to-peer manager 30 "returns [a] ranked list to the tracker node 20," the ranked list representing a **search result**

generated by **content management server** represented by tracker node 20. *Id.* Schwan discloses another embodiment where the “peer-to-peer manager 30 communicates the relevant topology information for the tracker node 20 to directly generate the optimized list in accordance with predefined rules.” EX1004, [0036], *see also id.*, [0029]-[0032], FIG. 2. In both of these embodiments, the **search engine** of tracker node 20 returns the **search result** to the **user’s device** because tracker node 20 “returns the ranked peer list to the requesting peer node A.” EX1004, [0032], FIG. 2.

Element [1e]: wherein the user’s device obtains the link data of the P2P device within the P2P device community according to the topology data table of the online server and the search result.

86. As I described in my analysis of Elements [1b] and [1d], *supra*, the peer-to-peer manager 30 represents an **online server** that stores a **topology data table** including **link data** between each of the **P2P devices** of the **P2P device community**. EX1004, [0029]-[0032], FIG. 2. It is clear, for example, that tracker node 20 generates an initial list of peer nodes by searching table 32 and sending the initial list to peer-to-peer manager 30 which ranks the initial list using “ranking criteria” that depend on the **link data** of the **topology data table** as part of a process to generate a **search result**. EX1004, [0029]-[0032], FIG. 2. One of these ranking criteria involves “ranking the peer nodes as a function of the access network to which they are connected,” leading to peer nodes connected to the same ISP as the requesting

peer node being ranked higher and peer nodes connected to other ISPs being ranked lower. EX1004, [0031], FIG. 2. Another ranking criterion involves using the latency measurements, with lower latencies resulting in a higher ranking and vice versa. *Id.* Schwan discloses another embodiment where peer-to-peer manager 30 communicates “relevant topology information” to the tracker node 20 so that tracker node 20 generates the ranked list according to “predefined rules” including the ranking criteria. EX1004, [0036]; *supra*, Element [1a]. In another embodiment, the peer-to-peer manager 30 filters the initial list in accordance with one or more filtering criteria. For example, locality (ISP) can serve as the filtering criterion, meaning that peer nodes that do not connect to the same ISP as the requesting peer node are suppressed from the ranked list. EX1004, [0035].

87. Schwan explains that peer-to-peer manager 30 and/or peer node 20 ranks or filters the initial list of peer nodes, and returns the ranked or filtered list to the *user’s device* peer node A. EX1004, [0030]-[0032], FIG. 2. FIG. 2 depicts the ranked or filtered list of peer nodes to include peer node B as the first node, followed by peer nodes C, E, and D. EX1004, [0031], FIG. 1. Peer node A obtains **link data** because the ranked or filtered list of peer nodes data indicates connections between peer node A and other peer nodes that can supply the requested resource when the *user’s device* represented by peer node A receives this ranked or filtered list of peer nodes. EX1004, [0029]-[0032], FIG. 2. It is clear that Schwan expressly discloses

that when the *user's device* represented by peer node A receives the ranked or filtered list of peer nodes, “[t]hen peer node A can contact the peer nodes accordingly.” EX1004, [0032], FIG. 2. Peer node A therefore obtains **link data** for contacting other peer nodes to obtain the requested resource by obtaining the ranked or filtered list of peer nodes. EX1004, [0029]-[0032], FIG. 2. In embodiments where the peer-to-peer manager 30 suppresses peer nodes that do not connect to the same ISP as peer node A from the filtered list, peer node A obtains **link data** because the filtered list of peer nodes provides a connection relationship indicating that all peer nodes in the filtered list connect to the same ISP. EX1004, [0035].

88. Because the **search result** includes the ranked or filtered list of peer nodes that prompts peer node A to “then...contact the peer nodes accordingly” using the **link data**, peer node A obtains this **link data** according to the **search result** generated by the **search engine** of tracker node 20. EX1004, [0032], FIG. 2. According to Schwan, peer node A also obtains the **link data** according to the **topology data table** of the online server. EX1004, [0031], FIG. 2. My opinion here is supported by the fact that peer-to-peer manager 30 or the tracker node 20 ranks or filters the initial list of peer nodes based on ranking criteria or filtering criteria that use information from the **topology data table**. EX1004, [0031], FIG. 2. It is apparent that peer node B is at the top of the ranked or filtered peer list because peer node B and peer node A are connected to the same access network (ISP1), and there is a

small latency (3 milliseconds) between peer nodes A and B. EX1004, [0029]-[0032], FIG. 2. Furthermore, in cases where the filtered list includes only P2P nodes within the same ISP as peer node A, the filtered list includes **link data** indicating that all of the identified peer nodes are linked to the same ISP. EX1004, [0035].

89. The *user's device* corresponding to peer node A obtains the **link data** for one or more **P2P devices** of the **P2P device community** that include the resource requested in the **search request**, because the ranked or filtered peer list includes the peer nodes storing "chunck2," the requested resource. *Id.* Consequently, the *user's device* corresponding to peer node A obtains **link data** of one or more **P2P devices** of the **P2P device community** according to the **topology data table** of the **online server** and the **search result**. *Id.* This supports my opinion that peer node A obtains the **link data** according to the **topology data table** of the **online server**. EX1004, [0029]-[0032], FIG. 2.

Claim [2]: The searching system of claim 1, wherein each the P2P device includes a weighted data, and the content management server is provided with a sorting algorithm module creating the weighted data based on the link data associated with the P2P device, the search result being sorted by the order of the weighted data of the P2P device so as to generate a sorted search result.

90. As I described in my analysis of Elements [1b]-[1c], *supra*, the P2P system of Schwan includes a peer-to-peer manager 30 representing an **online server** that stores a **table** 34 including **topology data** and a tracker node 20 representing a **content management server** that stores a table 32 including an **index database**.

EX1004, [0028]-[0032], FIG. 2. The **topology data** included in table 34 includes **link data** for each peer node of the **P2P device community**, including the identity of each peer node, the ISP that the peer node is connected to, and the latency between each peer node and one or more other peer nodes. EX1004, [0031], *see also id.*, [0028]-[0030], [0032], FIG. 2. The **index database** includes a list of resources stored by each peer node of the **P2P device community**. EX1004, [0029], [0030], FIG. 2.

91. The tracker node 20 of Schwan clearly generates an initial list of peer nodes based on receiving a **search request** from peer node A by searching the **index database**. EX1004, [0029]-[0032], FIG. 2. Schwan explains that this initial list of peer nodes is **sorted** according to “ranking criteria” that depend on the **link data** stored in the **topology data table**. EX1004, [0029]-[0032], FIG. 2. My opinion here is supported by the fact that the **sorting** techniques of Schwan ensure that the most ideal peer nodes for obtaining the requested resource appear at the top of the ranked peer list that is delivered to peer node A. EX1004, [0030] (“specific rules to rank the peer nodes of the initial list as a function of the quality of the connection with the requesting peer node A”), [0031], FIG. 2. Consequently, it is clear that Schwan’s P2P system creates **weighted data** based on the **link data** stored in the **topology data table** and uses this **weighted data** to sort the initial peer list by the **order** of the **weighted data**. EX1004, [0029]-[0032], FIG. 2.

92. Schwan discloses one embodiment where tracker node 20 and peer-to-peer manager 30 “cooperate...to generate the...ranked list” of peer nodes. EX1004, [0036], FIG. 2. This embodiment involves a “peer-to-peer manager 30” that “communicates the relevant topology information for the tracker node 20 to directly *generate the optimized list* in accordance with *predefined rules*.” *Id.* The **content management server** represented by tracker node 20 is therefore provided with a **sorting algorithm module** that uses the **link data** from the **topology data table** for generating a **sorted search result** based on the initial peer list generated by tracker node 20. EX1004, [0029]-[0032], [0036], FIG. 2. Schwan therefore explains that the ranked peer list delivered by the tracker node 20 to peer node A (thus **each the P2P device includes a weighted data**) represents a **sorted search result**. *Id.* Based on **link data** obtained from the **topology data table** of peer-to-peer manager 30, the **sorted search result** is sorted by a **sorting algorithm module** of tracker node 20 according to **weighted data** that tracker node 20 creates based on **link data** obtained from the **topology data table** of peer-to-peer manager 30. *Id.*

Claim [3]: The searching system of claim 2, further comprising: a weight look-up table recorded with the weighted data of each the P2P device, wherein the weight look-up table is stored in the content management server, the online server, or a storage device.

93. Schwan explains that tracker node 20 can “cache the topology information from the P2P manager in order to have fast access to a nearly up-to-date list with all online peers and the connection ratings between them,” EX1004, [0036],

FIG. 2. The system of Schwan generates these “connection ratings” based on “any information that is made available...about the physical topology.” EX1004, [0030], FIG. 2. This supports my opinion that the connection ratings represent **weighted data** of each **P2P device** of Schwan’s **P2P device community**. *Id.* Schwan’s disclosure explaining that the “topology information” and “specific rules” are used to “rank the peer nodes of the initial list as a function of the quality of the connection with the requesting peer node A,” also supports my opinion. *Id.*

94. The content management server includes a **weight look-up table** recorded with the **weighted data** corresponding to each **P2P device** because the **content management server** represented by tracker node 20 stores a “cache” including an “up-to-date list with all online peers and the connection ratings between them.” EX1004, [0030], [0031], [0035], [0036], FIG. 2. When peer node A sends a request to tracker node 20, the tracker node 20 forwards this request to peer-to-peer manager 30 which creates a sorted search result (**weight look-up table stored in an online server**). EX1004, [0028]-[0032]. FIG. 2. Peer-to-peer manager 30 sends this sorted search result back to peer node A through the **content server** represented by tracker 20. EX1004, [0028]-[0032]. FIG. 2. Thus, this **weight look-up table** 34 is stored (1) on the P2P Manager 30 (**online server**), (2) the **content manager server** represented as tracker 20, and (3) a **storage device** represented by the P2P node disclosing all the storage options in the claim element.

Claim [4]: The searching system of claim 2, wherein the sorting algorithm module performs a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result, and the weighted search result is sorted by the order of the weighted search results so as to generate a weighted and sorted search result.

95. Schwan describes techniques for using a **function operation** to sort the initial peer list generated by tracker node 20 because the P2P system uses “topology information and specific rules to rank the peer nodes of the initial list as a **function** of the quality of the connection with the requesting peer node A.” EX1004, [0030], [0031], [0035], [0036], FIG. 2; *supra*, Claim [2]. Schwan explains that **weighted data** comprising a “connection rating” for each connection between peer node A and another peer node represents topology information used to sort the initial peer list. *Id.* Schwan expressly discloses that tracker node 20 “cooperates with the P2P Manager 30 to get ratings for connections between two or more peers” to determine the **weighted data**. EX1004, [0035], FIG. 2. Schwan explains that “the peer-to-peer manager 30 communicates the relevant topology information for the tracker node 20 to directly generate the optimized list in accordance with predefined rules.” EX1004, [0036], FIG. 2.

96. Therefore, Schwan explains that the **sorting algorithm module** of the **content management server** represented by tracker node 20 performs a **function operation** to generate the sorted list of peer nodes based on the **connection ratings** representing **weighted data** and the initial list of peer nodes from the **search result**.

EX1004, [0030], [0031], [0035], [0036], FIG. 2. Because the ranked list is **sorted** based on connection quality using the **weighted data** that indicates the connection rating of each link, it is clear that the ranked list of peer nodes represents a **weighted** and **sorted search result**. *Id.*

Claim [7]: The searching system of claim 1, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

97. As I described in my analysis of Elements [1c]-[1d], *supra*, the **content management server** represented by tracker node 20 stores an **index database** including a table 32 that provides a list of resources stored by each of peer nodes A-E. EX1004, [0029], [0030], FIG. 2. Each resource listed in Schwan's **index database** is associated with **indexed data** comprising a number that identifies the resource (e.g., the index number 2 corresponds to the resource "chunk2"). *Id.* Schwan explains that "tracker node 20 maintains a list of the active peers in the peer-to-peer network and the respective resources that they hold," which supports my opinion that that the **content management server** creates the **indexed data** including index numbers (e.g., "chunk 2") for each resource. EX1004, [0029], *see also id.*, [0030] FIG. 2. The **content management server** represented by tracker node 20 therefore includes a **network gathering module** that gathers information from the peer nodes indicating the resources stored by each peer node to maintain this list of active peers and the resources they hold. *Id.*

Claim [8]: The searching system of claim 1, wherein the user's device connects to the P2P device according to the link data and downloads the file data based on the link data.

98. As I described in my analysis of Element [1e], *supra*, the ***user's device*** represented by peer node A obtains a ranked search result indicating ***link data*** corresponding to one or more peer nodes that store a requested resource. EX1004, [0028]-[0032], FIG. 2. The user's device ***connects*** to one or more ***P2P devices*** based on the ***link data*** because Schwan explains that the "peer node A can contact the peer nodes accordingly" with the ***link data***. EX1004, [0032], *see also id.*, [0028]-[0031], FIG. 2. Schwan also explains that peer node A sends a ***search request*** to tracker node 20 when "peer node A wants to ***download*** a ***file***...from the...P2P network." EX1004, [0029], *see also id.*, [0004], FIG. 2. Tracker node 20 returns a ranked list of peer nodes that host the requested file data based on this search request, so that peer node A can ***download*** the ***file data*** based on the ***link data*** corresponding to the ranked search result. *Id.*

Claim [9]: The searching system of claim 1, wherein the user's device connects to the P2P device based on the link data.

99. Schwan provides this claim element for at least the same reasons I described above in connection with Claim [8]. *See supra*, Claim [8].

Element [11pre]: A searching method for a P2P device community, applicable to a searching system for a P2P device community, the searching system includes at least one P2P device, an online server, and a content management server, the searching method comprising the steps of:

100. Schwan provides this claim element for at least the same reasons I described above in connection with Elements [1pre]-[1c]. *See supra*, Elements [1pre]-[1c].

Element [11a]: recording a link data of each the P2P device to generate a topology data table and storing the topology data table in the online server, wherein each the P2P devices respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

101. Schwan provides this claim element for at least the same reasons I described above in connection with Elements [1a]-[1b]. *See supra*, Elements [1a]-[1b].

Element [11b]: recording the indexed data of each the P2P device and storing the indexed data in an index database of the content management server;

102. Schwan provides this claim element for at least the same reasons I described above in connection with Elements [1c]-[1d]. *See supra*, Elements [1c]-[1d].

Element [11c]: receiving by the content management server a search request sent from a user's device and generating a search result by searching the index database based on the search request;

103. Schwan provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Element [1d].

Element [11d]: returning the search result to the user's device; and

104. Schwan provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Element [1d].

Element [11e]: obtaining the link data of the P2P device within the P2P device community by the user's device according to the topology data table of the online server and the search result.

105. Schwan provides this claim element for at least the same reasons I described above in connection with Element [1e]. *See supra*, Element [1e].

Claim [12]: The searching method of claim 11, further comprising the steps of: creating a weighted data associated with each the P2P device by the content management unit based on the link data of the P2P devices; performing a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result; and sorting the weighted search result based on the order of the weighted search results to generate a weighed and sorted search result.

106. Schwan provides this claim element for at least the same reasons I described above in connection with Claims [2] and [4]. *See supra*, Claims [2] and [4].

Claim [13]: The searching method of claim 12, further comprising the steps of: recording the weighted data of the P2P devices to generate a weight look-up table; and storing the weight look-up table in the content management server, the online server, or a storage device.

107. Schwan provides this claim element for at least the same reasons I described above in connection with Claim [3]. *See supra*, Claim [3].

Claim [16]: The searching method of claim 11, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

108. Schwan provides this claim element for at least the same reasons I described above in connection with Claim [7]. *See supra*, Claim [7].

Claim [18]: The searching method of claim 17, further comprising the steps of: connecting to the P2P device and downloading the file data by the user's device based on the link data.

109. Schwan provides this claim element for at least the same reasons I described above in connection with Claim [8]. See *supra*, Claim [8].

Claim [19]: The searching method of claim 11, further comprising the steps of: connecting to the P2P device by the user's device based on the link data.

110. Schwan provides this claim element for at least the same reasons I described above in connection with Claim [9]. See *supra*, Claim [9].

B. The Schwan-Lee Combination Renders Claims 1-4, 7-13, and 16-19 Obvious

Elements [1pre]-[1b]: A searching system for a P2P (peer-to-peer) device community, for receiving a search request sent from at least one user's device, the searching system comprising: at least one P2P device community, wherein each the P2P device community includes at least one P2P device, wherein each the P2P device respectively comprises at least one file data, and each the file data comprises a content data and an indexed data; at least one online server connecting to the P2P device community, each the online server includes a topology data table, the topology data table being recorded with a link data between each of the P2P devices of the P2P device community; and

111. The Schwan-Lee combination discloses and renders obvious Elements [1pre]-[1b] for at least the same reasons that I addressed above in connection with Ground 1A (§X.A) at Elements [1pre]-[1b]. See *supra*, Ground 1A (§X.A) at Elements [1pre]-[1b].

Elements [1c]-[1d]: at least one content management server connecting to the P2P device community and the online server respectively, each the content management server includes a search engine, an index database, and a user's device management unit, wherein the index database records the indexed data of each the P2P device of the P2P device community, the user's device management

unit receives the search request sent from the user's device, the search engine searches the index database to generate a search result based on the search request and then returning the search result to the user's device,

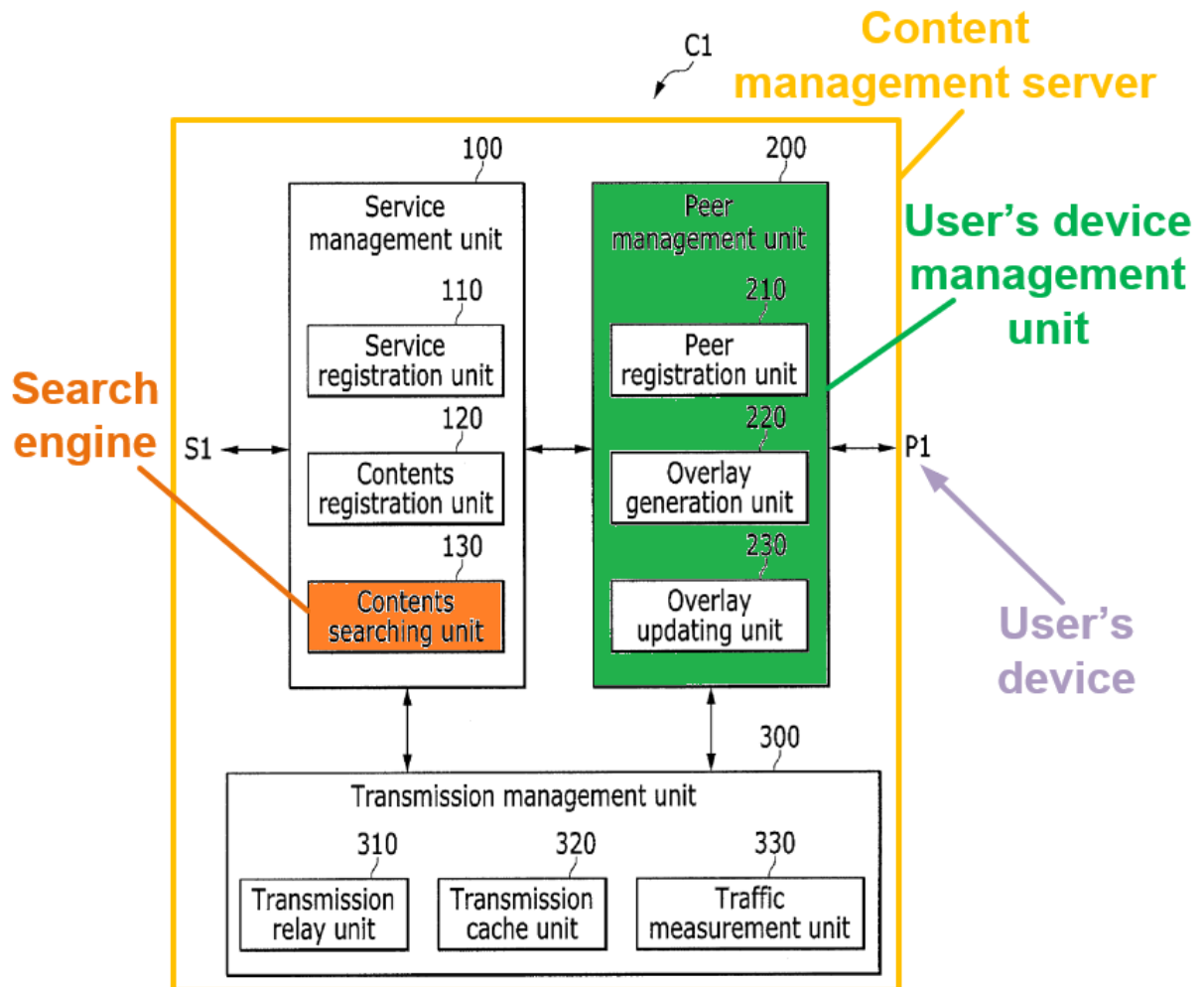
112. The Schwan-Lee combination discloses and renders obvious Elements [1c]-[1d] for at least the same reasons that I addressed above in connection with Ground 1A (§X.A) at Elements [1c]-[1d]. *See supra*, Ground 1A (§X.A) at Elements [1c]-[1d]. For example, as I discussed in my analysis of Ground 1A (§X.A) at Element [1c], *supra*, Schwan discloses a tracker node 20 representing a **content management server** that connects to a **P2P device community** including peer nodes A-E and an **online server** represented by a peer-to-peer manager 30. EX1004, [0028]-[0039], FIG. 2. Even if Schwan does not expressly disclose that the **content management server** includes a **search engine** and a **user's device management unit**, it is clear that such features would have been obvious and provided in the Schwan-Lee combination. EX1005, [0045]-[0055], FIG. 3.

113. Lee describes a P2P control device C1 including a service management unit 100. EX1005, [0047], [0052], FIG. 3. This service management unit 100 includes a contents searching unit 130. *Id.* It is apparent that the contents searching unit 130 represents a **search engine** because unit 130 “searches for an appropriate version of contents fitting the characteristics of the peer P1 with respect to a corresponding type of contents selected by the peer P1 and transfers the information regarding the searched version of contents to the peer P1.” EX1005, [0052], FIG. 3.

Control device C1 thus includes a **content management server** including a **search engine** that generates a search result based on receiving a **search request** from a peer.

EX1005, [0045]-[0055], FIG. 3.

FIG. 3



EX1005, FIG. 3 (annotated).

114. P2P control device C1 includes a peer **management unit** 200 that “registers the peer P1 according to a registration request from the peer P1, and manages information regarding the registered peer P1,” meaning that peer

management unit 200 clearly represents a *user's device management unit*. EX1005, [0053], *see also id.*, [0052], [0054], [0055], [0075]-[0082], FIG. 3, FIG. 6. FIG. 3 of Lee depicts peer management unit 200 as being connected to a user's device represented by peer P1. EX1005, FIG. 3. This means that the peer *management unit* 200 represents a *user's device management unit* that receives the *search request* sent from the *user's device* when peer P1 sends a *search request* to the P2P control device C1. EX1005, [0052]-[0055], [0075]-[0082], FIG. 3, FIG. 6.

Element [1e]: wherein the user's device obtains the link data of the P2P device within the P2P device community according to the topology data table of the online server and the search result.

115. The Schwan-Lee combination discloses and renders obvious Element [1e] for at least the same reasons that I addressed above in connection with Ground 1A (§X.A) at Element [1e]. *See supra*, Ground 1A (§X.A) at Element [1e]. For example, Schwan explains that the *content management server* represented by tracker node 20 “returns [a] ranked peer list to the requesting peer node A” in response to the peer node A sending “a request to the tracker.” EX1004, [0029]-[0032], FIG. 2. Schwan also explains that the *user's device* represented by peer node A “can contact the peer nodes accordingly.” EX1004, [0032]. Even if Schwan does not disclose that the *user's device* obtains link data for *P2P devices* indicated by the ranked peer list according to *topology data table* stored by the peer-to-peer manager 30 and the *search result* represented by the ranked peer list, it is clear that these

features would have been obvious and provided in the Schwan-Lee combination. EX1005, [0034], [0042]-[0044], [0053]-[0054], [0089]-[0094], FIG. 2, FIG. 3, FIG. 8.

116. Lee explains that one of peers P1-P3—which represents a *user's device*—outputs a request for a contents search to P2P control device C1. EX1005, [0052], [0076]-[0082], FIG. 3, FIG. 6. The P2P control device C1 performs the contents search and returns a *search result* to the *user's device*. *Id.* A contents identifier corresponding to the contents requested by the *user's device* is included in the search result EX1005, [0077], *see also id.*, [0052]. Subsequently, the *user's device* outputs a request including the contents identifier for P2P control device C1. EX1005, [0053]-[0055], [0089]-[0094], FIG. 3, FIG. 8. This establishes an overlay for the *user's device* to download the resource associated with the contents identifier. EX1005, [0053]-[0055], [0089]-[0094], FIG. 3, FIG. 8.

117. Lee describes “a contents searching unit” that is “configured to receive a request for searching for [] desired contents from [a] requesting peer...and provide a contents identifier of searched contents to the requesting peer.” EX1005, Cl. 1, Cl. 5. Lee expressly discloses that “an overlay generation unit” is “configured to receive an overlay generation request of desired contents from [the] requesting peer,” and “the overlay generation request comprises the contents identifier.” *Id.* This supports

my opinion that Lee discloses a peer P1 representing a *user's device* that requests an overlay **according to** the contents identifier included in a **search result**. *Id.*

118. Lee explains that “overlay generation unit 220 generates the P2P overlay by collectively analyzing and considering information regarding the corresponding application service, the peer, and the network” to generate the overlay requested by the user’s device. EX1005, [0054], *see also id.*, [0092]. Lee describes the information used to create the overlay as including “network **topology**, a maximum bandwidth, a current network usage, a transmission delay time, and the like.” *Id.* Next, P2P control device C1 “transfers information regarding a connection to parent and child nodes corresponding to the P2P overlay to the peer P1”, and this information represents **link data**. *Id.*

119. It is apparent, therefore, that Lee suggests that a *user's device* represented by peer P1 can advantageously obtain **link data** including connection information for establishing an overlay according to information regarding the network **topology** by sending an overlay request including a contents identifier from a **search result**. EX1005, [0053], [0054], [0092], Cl. 1, Cl. 5. The predictable Schwan-Lee combination (articulated above) would have achieved this conventional solution in which the user’s device obtains link data of a **P2P device** within a P2P device community according to a **topology data table** and a **search result**. *Supra*, §IX.C.

Claims [2]-[4] and [7]-[9]:

Claim [2]: The searching system of claim 1, wherein each the P2P device includes a weighted data, and the content management server is provided with a sorting algorithm module creating the weighted data based on the link data associated with the P2P device, the search result being sorted by the order of the weighted data of the P2P device so as to generate a sorted search result.

Claim [3]: The searching system of claim 2, further comprising: a weight look-up table recorded with the weighted data of each the P2P device, wherein the weight look-up table is stored in the content management server, the online server, or a storage device.

Claim [4]: The searching system of claim 2, wherein the sorting algorithm module performs a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result, and the weighted search result is sorted by the order of the weighted search results so as to generate a weighted and sorted search result.

Claim [7]: The searching system of claim 1, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

Claim [8]: The searching system of claim 1, wherein the user's device connects to the P2P device according to the link data and downloads the file data based on the link data.

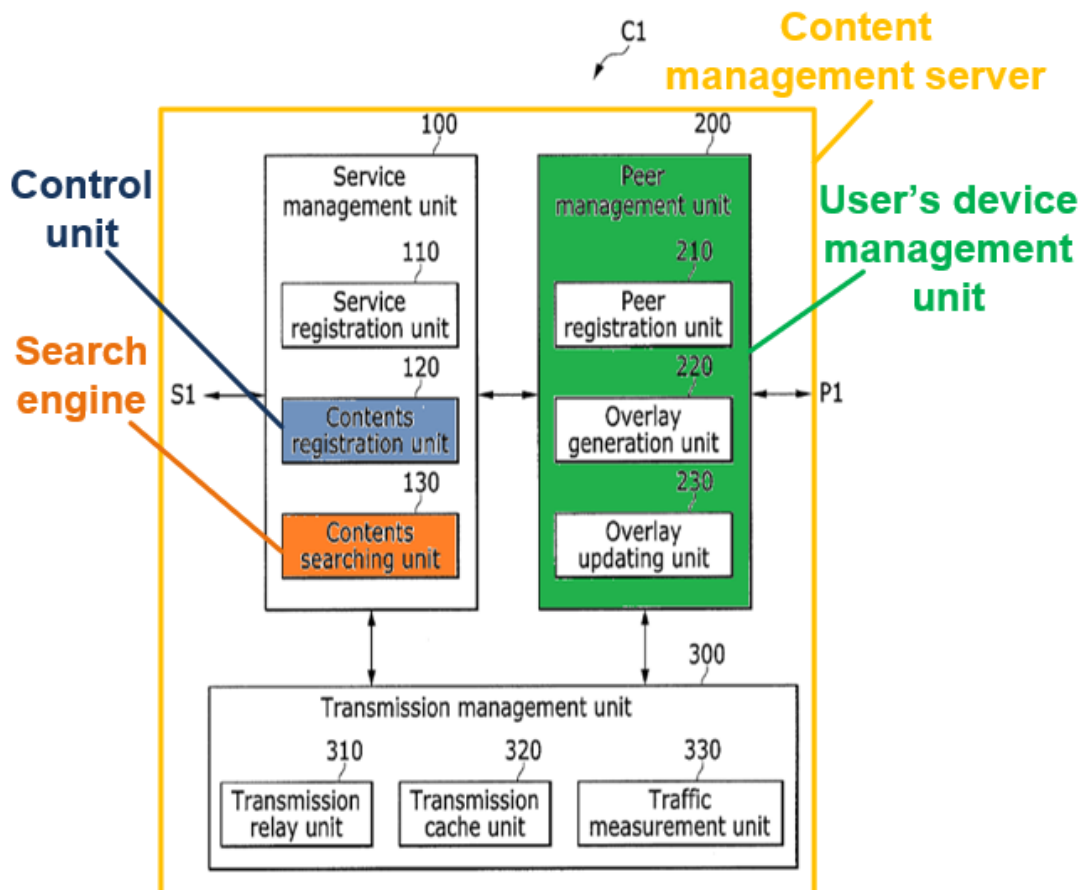
Claim [9]: The searching system of claim 1, wherein the user's device connects to the P2P device based on the link data.

120. The Schwan-Lee combination discloses and renders obvious Claims [2]-[4] and [7]-[9] for at least the same reasons that I addressed above in connection with Ground 1A (§X.A) at Claims [2]-[4] and [7]-[9]. See *supra*, Ground 1A (§X.A) at Claims [2]-[4] and [7]-[9].

Claim [10]: A P2P device applicable to the searching system of claim 1, comprising: a control unit controlling the file data being an open state or a hidden state.

121. Lee explains that the P2P control device C1 of includes a “contents registration unit 120” that receives a “contents registration request from the contents server S1 and registers information regarding contents providing an application service,” which indicates that the P2P control device C1 clearly ***controls*** the data offered by P2P devices over the P2P network. EX1005, [0050], *see also id.*, [0069]-[0074], FIG. 3, FIG. 5. In particular, Lee explains “[t]he P2P control device C1 registers the contents information received from the contents server S1 and manages the contents information by assigning a contents identifier to the registered contents information.” EX1005, [0071], FIG. 5. Furthermore, it is clear that Lee also suggests the P2P control device C1 should output the contents identifier to contents server S1 when the registration is complete. EX1005, [0074], FIG. 5.

FIG. 3



EX1005, FIG. 3 (annotated).

122. Thus, it is clear that server S1 includes a **control unit** that registers contents with the contents registration unit 120 of the P2P control device C1. EX1005, [0051], [0071]. The **control unit** of server S1 controls **file data** to occupy an **open state** because registration results in a contents identifier associated with the **file data** by virtue of registering contents including the **file data**. EX1005, [0038]-[0055], [0069]-[0074], FIG. 2, FIG. 3, FIG. 5. Lee explains that peers establish an overlay connection for downloading the contents using the contents identifier in the

open state. EX1005, [0054], [0055], [0089]-[0094], FIG. 3, FIG. 8. Alternatively, when server S1 does not register contents with the contents registration unit 120, the contents remain in a **hidden state** because P2P control device C1 cannot provide a contents identifier for peers to access the **file data**. *Id.* It is clear, therefore that the predictable Schwan-Lee combination would have provided such a **control unit** that controls the open or hidden state, as suggested by Lee to facilitate “active[] update[s]” of the participating peers and to “increas[e] content transmission quality.” EX1005, [0012], [0014].

Element [11pre]: A searching method for a P2P device community, applicable to a searching system for a P2P device community, the searching system includes at least one P2P device, an online server, and a content management server, the searching method comprising the steps of:

123. The Schwan-Lee combination discloses and renders obvious Element [11pre] for at least the same reasons that I addressed above in connection with Ground 1A (§X.A) at Elements [1pre]-[1c]. See *supra*, Ground 1A (§X.A) at Elements [1pre]-[1b].

Element [11a]: recording a link data of each the P2P device to generate a topology data table and storing the topology data table in the online server, wherein each the P2P devices respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

124. The Schwan-Lee combination discloses and renders obvious Element [11a] for at least the same reasons that I addressed above in connection with Ground

1A (§X.A) at Elements [1a]-[1b]. *See supra*, Ground 1A (§X.A) at Elements [1a]-[1b].

Elements [11b]-[11d]: recording the indexed data of each the P2P device and storing the indexed data in an index database of the content management server; device and generating a search result by searching the index database based on the search request; returning the search result to the user's device; and

125. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Elements [1c]-[1d]. *See supra*, Elements [1c]-[1d].

Element [11e]: obtaining the link data of the P2P device within the P2P device community by the user's device according to the topology data table of the online server and the search result.

126. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Element [1e]. *See supra*, Element [1e].

Claim [12]: The searching method of claim 11, further comprising the steps of: creating a weighted data associated with each the P2P device by the content management unit based on the link data of the P2P devices; performing a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result; and sorting the weighted search result based on the order of the weighted search results to generate a weighed and sorted search result.

127. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [2]. *See supra*, Claim [2].

Claim [13]: The searching method of claim 12, further comprising the steps of: recording the weighted data of the P2P devices to generate a weight look-up

table; and storing the weight look-up table in the content management server, the online server, or a storage device.

128. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [3]. *See supra*, Claim [3].

Claim [16]: The searching method of claim 11, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

129. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [7]. *See supra*, Claim [7].

Claim [17]: The searching method of claim 11, further comprising the step of: controlling a file data of each the P2P device being an open state or a hidden state.

130. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [10]. *See supra*, Claim [10].

Claim [18]: The searching method of claim 17, further comprising the steps of: connecting to the P2P device and downloading the file data by the user's device based on the link data.

131. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [8]. *See supra*, Claim [8].

Claim [19]: The searching method of claim 11, further comprising the steps of: connecting to the P2P device by the user's device based on the link data.

132. The Schwan-Lee combination provides this claim element for at least the same reasons I described above in connection with Claim [9]. *See supra*, Claim [9].

C. The Schwan-Lee-Strickland Combination Renders Claims 5, 6, 14, and 15 Obvious

Claim [5]: The searching system of claim 1, wherein the user's device management unit includes a user-charge module, and wherein after confirming that the user's device has been charged, the content management server provides the search result, or the online server provides at least one of the link data of the P2P device, to the user's device.

133. As I described in my analysis of Ground 1A (§X.A) and ground 1B (§X.B) at Element [1c], *supra*, Schwan describes a ***content management server*** represented by tracker node 20 that includes a ***user's device management unit***. EX1004, [0028]-[0039], FIG. 2; EX1005, [0045]-[0055], FIG. 2. Strickland describes a ***user's device management unit*** that receives a ***search request*** from a ***user's device*** because Strickland describes a P2P server that receives a search query from “[u]ser 1 operating a first end user device.” EX1006, [0099], *see also id.*, [0052], [0059], [0060], [0092], [0093], FIG. 2. The P2P server searches a database to identify matching files based on receiving the search query. *Id.* The P2P server sends the matching files to the first end user device. *Id.* Next, the P2P server receives a selection of a particular file (e.g., file A) that is hosted by “a second end user device associated with User 2.” *Id.*

134. Strickland describes one embodiment involving “direct” transactions, where a P2P server is configured to “charge User 1 a monetary amount (Dollar, Euro, etc.) for the downloading of File A” from the second end user device as part of a direct monetary transaction at which point the system confirms that User 1 has been charged. EX1006, [0100], *see also id.*, [0092], [0093], FIG. 2. Strickland also expressly discloses that “[i]n step 112, the server compensates User 2 with a credit...for providing File A to User 1,” another step where it is confirmed that User 1 has been charged. *Id.* Therefore, it is apparent that Strickland describes a ***user-charge module*** that confirms that a ***user’s device*** represented by the first end user device has been charged before advancing a file download to provide a ***search result*** in response to the ***search request***. *Id.*

135. Strickland describes another embodiment for facilitating “indirect” transactions. EX1006, [0100], [0105], [0106], FIG. 2. These indirect transactions involve the user’s device having an account of pre-purchased credits that are debited as the user’s device requests downloads. *Id.* For example, Strickland expressly discloses that that “a determination is made as to whether User 1 has accumulated enough file credits by examining User 1’s account” and “[i]f User 1 has accumulated enough file credits of the right type (certain types of credits may not be redeemable for downloads), the download is authorized in step 128, and User 1’s account is debited for the redeemed file credits.” EX1006, [0100], [0105], [0106], FIG. 2.

Strickland's ***user-charge module*** therefore advances the download to provide a ***search result after*** confirming that the ***user's device*** has been charged by confirming that user 1 has enough credits for a download before authorizing the download. EX1006, [0105], FIG. 2.

136. The ***content management server*** of the resulting system includes a ***user-charge module*** that provides a ***search result*** based on confirming that a ***user's device*** has been charged for downloading a file when the P2P system of the Schwan-Lee combination is implemented with Strickland's suggestion for supporting monetary transactions. EX1006, [0098]-[0106], FIG. 2; *supra*, §IX.E. In the predictable Schwan-Lee-Strickland combination, the ***content management server*** provides the ***search result*** and/or the ***link data*** to the ***user's device*** after the ***user-charge module*** confirms that the ***user's device*** has been charged. *Id.* It is apparent that this would prevent the user's device from using the link data to obtain the download before payment is completed. *Id.*

Claim [6]: The searching system of claim 5, wherein the user charge module receives a user's identity data, a charging data, a charging-mode data, or a payment confirmation data, all of which being sent from the user's device.

137. Strickland expressly discloses that the ***user-charge module*** of the P2P server "may automatically run a purchasing routine where User 1 is asked a series of questions, including questions for effectuating payment for the downloading of the file, such as for example, credit card information, bank account information, or

the like.” EX1006, [0100], *see also id.*, [0078], [0094], FIG. 2. This means that the **user-charge module** of the P2P server receives **charging data**, **charging-mode data**, and **payment confirmation data** from the **user’s device**. *Id.*

Claim [14]: The searching method of claim 11, further comprising the steps of: providing the search result by the content management server, or providing at least one link data of the P2P device by the online server, to the user’s device by the content management server confirming that the user’s device has been charged.

138. The Schwan-Lee-Strickland combination provides this claim element for at least the same reasons I described above in connection with Claim [5]. *See supra*, Claim [5].

Claim [15]: The searching method of claim 14, wherein the content management server confirming that the user’s device has been charged comprises the steps of: confirming a user’s identity data of the user’s device; receiving a charge-mode data sent from the user’s device; confirming a payment confirmation data sent from the user’s device; and recording a pricing data required for connection or down loading requested by the user’s device.

139. The Schwan-Lee-Strickland combination provides this claim element for at least the same reasons I described above in connection with Claim [6]. *See supra*, Claim [6]. Furthermore, it is apparent that confirming that the user’s device has been charged comprises confirming **identity data** of the **user’s** device because Strickland expressly discloses that “[a]nonymous users may not be able to redeem credits for merchandise, however, because the user may have to be identified to receive shipments.”.EX1006, [0061], *see also id.*, [0034], [0237]. Strickland confirms that the user has been charged by receiving charge-mode data sent from

the user's device because Strickland discloses that User 1 can make an indirect purchase using prepaid credits or a direct purchase using currency. EX1006, [0100], [0100], [0105], [0106], FIG. 2; *cf.* EX1001, 7:34-37 ("charge-mode data...allowing the user's devices...to select the payment plan which may be, for example, a monthly installment payment mode or pre-payment mode").

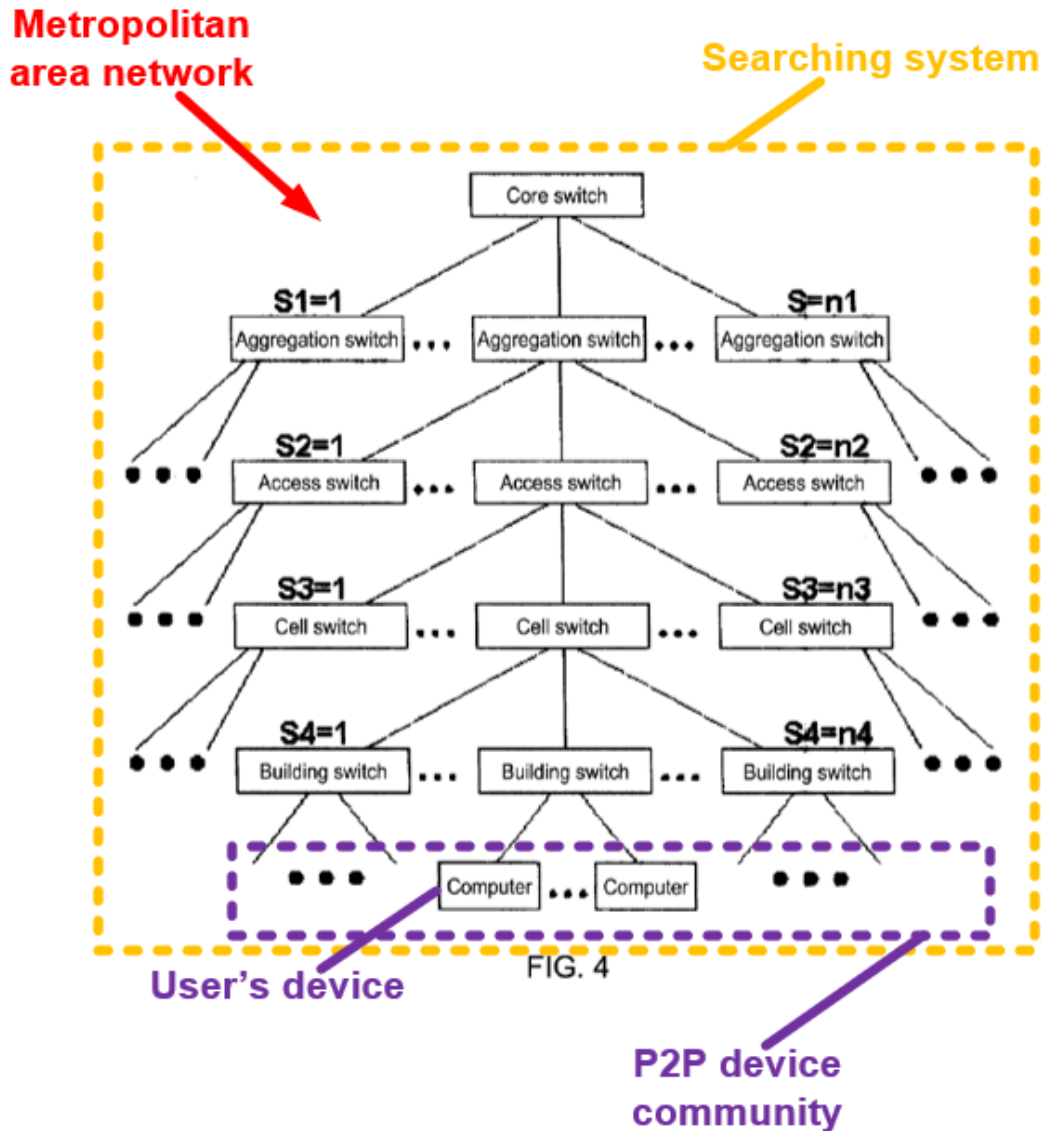
140. In both of the direct and indirect payment embodiments of Strickland, the P2P server confirms ***payment confirmation data*** to confirm that the user's device has been charged. EX1006, [0100], [0105], FIG. 2. This is because Strickland explains that for direct payments, the P2P server "proceeds...to charge User 1 a monetary...for the downloading of File A" and for indirect payments "User 1's account is debited for the redeemed file credits." *Id.* The P2P server charges User 1 at a price point in direct transactions. EX1006, [0100] ("[b]y way of example, a price point of 50 cents may be chosen"), *see also id.*, [0085]-[0088], FIG. 2. Credits have value in indirect transactions. EX1006, [0089]-[0091]. Thus, Strickland explains that the P2P server records ***pricing data*** required for ***downloading*** the selected file.

D. Li anticipates Claims 1, 7-9, 11, 16, 18, 19 Obvious

Element [1pre]: A searching system for a P2P (peer-to-peer) device community, for receiving a search request sent from at least one user's device, the searching system comprising;

141. To the extent the preamble is limiting, Li anticipates Element [1pre]. Li describes a plurality of P2P nodes—sometimes referred to as "P2P node

computers”—that represent a ***P2P device community***. EX1007, 2, 3, 5-17. Li describes a metropolitan area network comprising a plurality of switches that are interconnected in a multi-level tree pattern. EX1007, 2, 3, 5, 6, 9, 11, 12-16; *supra*, §IX.F. The P2P nodes of the ***P2P device community*** are connected to “building switches” of the multi-level tree pattern such that the P2P nodes can communicate with other devices that are connected to the metropolitan area network. EX1007, 2, 5-7, 9, 11-16, FIG. 4. Li expressly discloses that the metropolitan area network includes a ***searching system*** including a P2P index server and a topology server that handles “resource query requests” received from P2P nodes of the ***P2P device community***. EX1007, 5, 7, 8, 10, 11, 17.



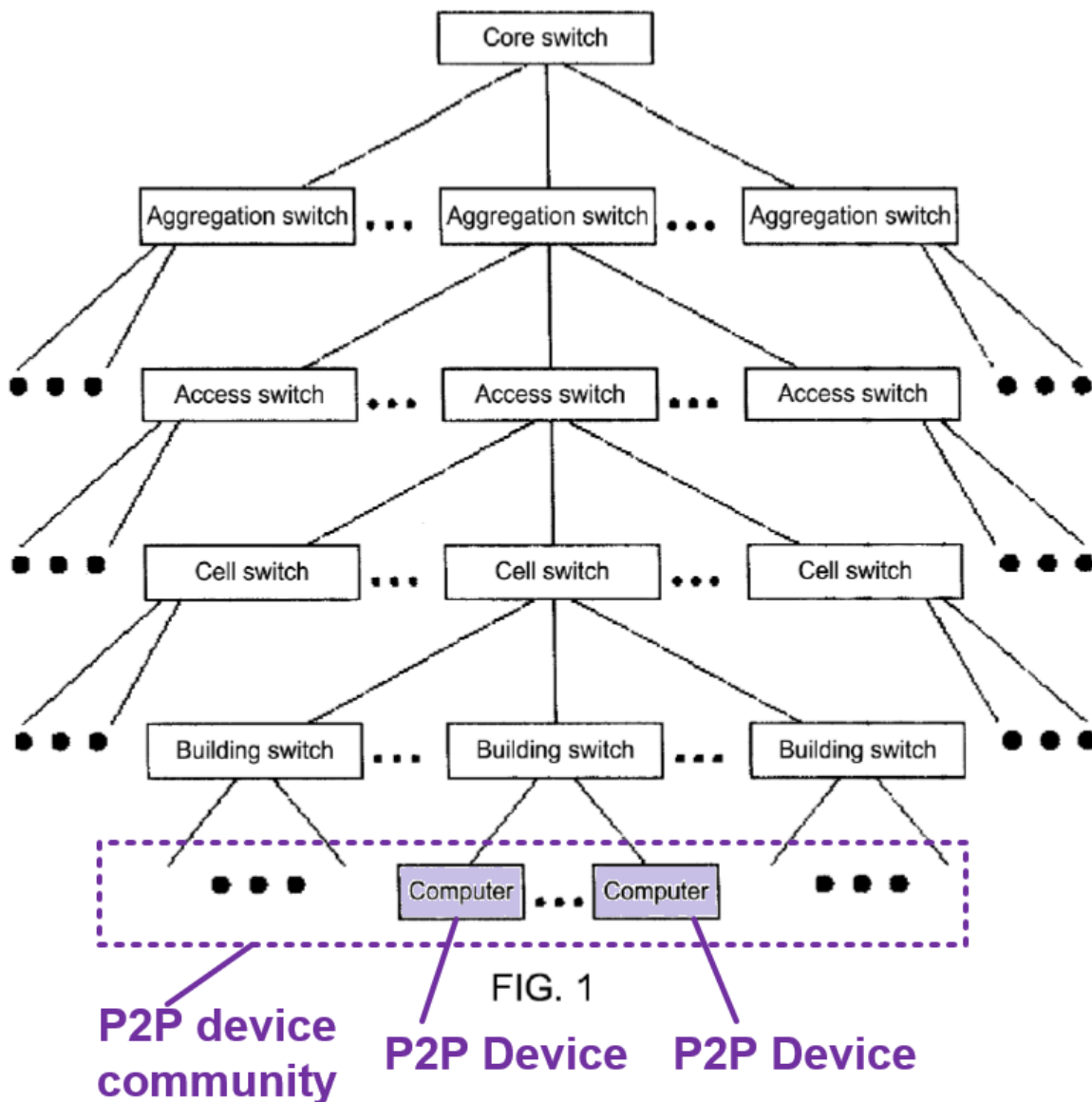
EX1007, FIG. 4 (annotated).

142. Li describes one embodiment where the P2P index server receives a “resource query request” from a “requesting P2P node” of the **P2P device community**. EX1007, 7, 9-11, 14-17, FIG. 4. This resource query request represents a **search request** “to download a certain resource.” EX1007, 14, *see also id.*, 5, 8, 10, 11, 18. Because Li expressly refers to P2P nodes connected to building switches

as “user computers” and “user nodes,” the requesting P2P node that sends the search request represents a *user’s device*. EX1007, 1-3.

Element [1a]: at least one P2P device community, wherein each the P2P device community includes at least one P2P device, wherein each the P2P device respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

143. Li describes a ***P2P device community*** including a plurality of P2P nodes, as I described in my analysis Element [1pre], *supra*. EX1007, 2, 3, 5-10, 12, 14-18, FIG. 4. These P2P nodes represent ***at least one P2P device*** of a ***P2P device community*** because Li expressly refers to P2P nodes as “P2P node computers” on multiple occasions EX1007, 8-10, 17, 18. Li also describes one embodiment where “[e]ach node computer is both a client that downloads from other nodes and a storage server that can share content stored thereby with other nodes, so that more massive and richer content can be provided, which becomes one of the important attractions of broadband networks.” EX1001, 1. My opinion here is confirmed by multiple sources disclosing that a common feature of ***P2P devices*** is an ability to share files with other P2P devices and an ability to download files from other P2P devices. EX1012, [0008]-[0012] (describing P2P nodes as having “distributed computing power and storage” and having search engines for identifying files to download from other P2P devices); EX1013, (describing peers that “exchange pieces of content with their connected peers 140”).



EX1007, FIG. 1 (annotated).

144. The *one or more P2P devices* of Li each store *file data* including *content data* because Li describes multiple examples of P2P nodes downloading files from other P2P nodes. EX1007, 2 (“[c]urrent P2P file transfer”), 2 (“[w]hen a P2P node needs to download a file...it is referred to as a requesting P2P node...computers have the resource, they are referred to as resource P2P nodes”), 3

(“[t]he requesting P2P node randomly selects resource P2P nodes, and obtains...file content from each resource P2P node”), 3 (“a user node downloads, from an adjacent computer on its own building switch, bytes of file content”), 12 (“[a] requesting P2P node needs to download a file”). It is clear that the **file data** stored by each P2P node in the **P2P device community** includes **content data** can be downloaded by other P2P nodes connected to the metropolitan area network. EX1007, 1 (“[e]ach node computer is both a client that downloads from other nodes and a storage server that can share content stored thereby with other nodes”), *see also id.*, 2-11, 14-18. Li sometimes refer to P2P nodes that store **content data** for download by other P2P nodes as “resource P2P nodes” and refers to P2P nodes that request downloads from resource P2P nodes as “requesting P2P nodes.” EX1007, 2, 3, 5, 7-12, 14-17.

145. As I described in my analysis of Elements [1pre]-[1a], *supra*, Li explains that the metropolitan area network includes a “P2P index server” that receives a query request from a requesting P2P node and performs “querying to obtain the resource P2P nodes having the resource” identified in the query request EX1007, 7, 10, 11, 14, 17. **Content data** stored by each resource P2P node is associated with **indexed data** identifying the **content data** because the P2P **index** server performs a query to identify a resource listed in an **index database**. EX1007, 7, 10, 11, 14, 17. The P2P index server identifies resource P2P nodes having the resource (**content data**) by identifying resource P2P nodes having **indexed data**

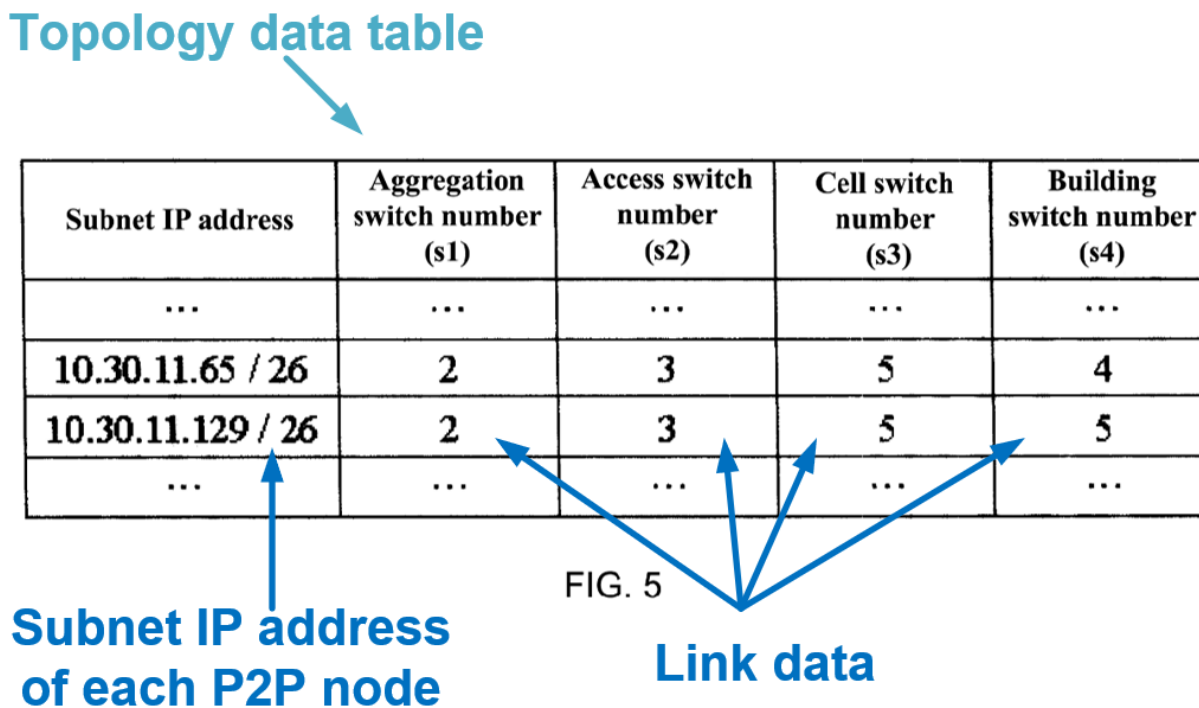
identifying the resource to “obtain a list of P2P nodes having the resource” as described by Li. EX1007, 7, 10, 11, 14, 17. References confirm that it was well known by the Critical Date of the ’655 Patent for P2P devices to store **file data** including **content data** and **indexed data**. EX1012, [0012] (“[i]n structured peer-to-peer networks, each computer is responsible only for a specific fraction of the content”), [0052] (explaining that “[o]n each node, an inverted index is stored that references storage locations for documents within the network”). Consequently, Li describes **at least one P2P device community** including **at least one P2P device**, each P2P device comprising at least one **file data** including **content data** and **indexed data**.

Element [1b]: at least one online server connecting to the P2P device community, each the online server includes a topology data table, the topology data table being recorded with a link data between each of the P2P devices of the P2P device community; and

146. Li describes the metropolitan area network as including a “topology server” that “stores the topological structure data of the entire metropolitan area network.” EX1007, 10, *see also id.*, 7, 8, 11, 14, 16, 17. Li’s topology server stores a topological data structure that includes “subnets and location vectors” for P2P nodes. EX1007, 10, *see also id.*, 6-9, 11, 14, 16, 17, FIGs. 1, 4, 5. Li describes these location vectors as being indicated “according to an IP address” of the P2P node. *Id.* It is apparent, therefore, that Li’s topology server represents an **online server**

connecting to the **P2P device community** that includes a **topology data table**. *Id.* FIG. 5 depicts the topological structure data. EX1007, 10, FIG. 5.

Topology data table



Subnet IP address	Aggregation switch number (s1)	Access switch number (s2)	Cell switch number (s3)	Building switch number (s4)
...	...	...	...	...
10.30.11.65 / 26	2	3	5	4
10.30.11.129 / 26	2	3	5	5
...	...	...	...	...

FIG. 5

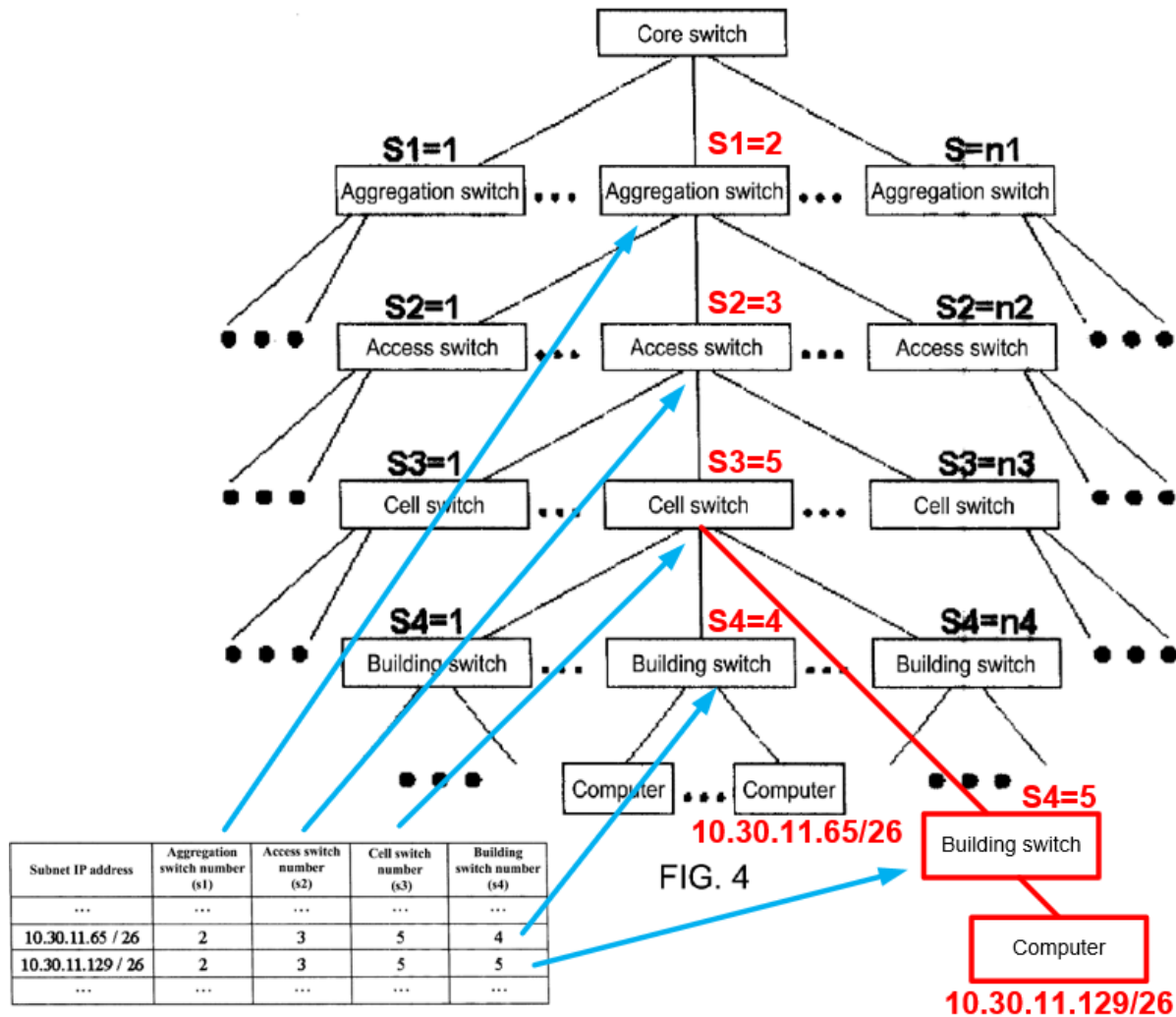
Subnet IP address of each P2P node

Link data

EX1007, FIG. 5 (annotated).

147. Li explains that a level “s1” indicates an aggregation switch, a level “s2” indicates an access switch, a level “s3” indicates a cell switch, and a level “s4” indicates a building switch. EX1007, 6, 9, 15, FIG. 4, FIG. 5. Numbers associated with these levels indicate an aggregation switch, an access switch, a cell switch, and a building switch that the P2P node is connected to. *Id.* The location vectors for Li’s P2P nodes represent **link data** between each of the **P2P devices** of the **P2P device community**. EX1007, 6-10, 15-17, FIGs. 1, 4, 5. This is because the location vectors reveal when two or more **P2P devices** are connected to the same switch and are

therefore **linked**. *Id.* Li's **topology data table** depicts location vectors for two different P2P nodes, both nodes being connected to the same aggregation switch (s1=2), access switch (s2=3), and cell switch (s3=5). EX1007, FIG. 5. These nodes, however, are connected to different building switches (s4=4 and s4=5, respectively), revealing that the two P2P nodes are **linked** via building switch s4=4, cell switch s3=5, and cell switch s4=5. EX1007, FIG. 5. The **topology server** is connected to Li's **P2P device community** because a requesting P2P node sends a search result including the list of resource P2P nodes to the **topology server** in some embodiments, and the **topology server** is able to return one or more nearest neighbor resource P2P nodes to the requesting P2P node. EX1007, 8, 10, 11, 16, 17, 18.



EX1007, FIG. 4 and FIG. 5 (modified and annotated).

148. Because Li's network consists of multiple levels including a core switch level followed by an aggregation switch level, an access switch level, a cell switch level, and a building switch level, the **topology data table** indicating the switches that each P2P device is connected to indicates with granularity how P2P devices are connected to each other over the network. EX1007, 1-3, 5-7, 9, 11, 14-16, FIG. 1, FIG. 4. P2P node computers connect to building switches, which means

that P2P node computers can communicate with P2P nodes connected to the same building switch via the building switch and communicate with P2P nodes connected to other building switches via “higher” levels in the network. *Id.* For example, the two **P2P devices** represented by the location vectors indicated in the **topology data table** of FIG. 5 can connect to each other via building switch s4=4, cell switch s3=5, and building switch s4=5, because the building switches s4=4 and s4=5 are both connected to the same cell switch s3=5. EX1007, 6, 9, 15, 16, FIG. 4, FIG. 5.

149. Consequently, the topology server of Li represents an **online server** that comprises a **topology data table** recorded with **link data** between each of **the P2P devices** of the **P2P device community**. EX1007, 6-10, 14, 16, 17, FIG. 1, FIG. 4, FIG. 5. Li explains that the topology server is “added in the metropolitan area network,” which means that in the **online server** is connected to the **P2P device community**. EX1007, 7, 14, 16.

Element [1c]: at least one content management server connecting to the P2P device community and the online server respectively, each the content management server includes a search engine, an index database, and a user’s device management unit,

150. The metropolitan area network described by Li includes a “P2P index server,” and this server receives queries from P2P nodes to download resources from other P2P nodes. EX1007, 11 (“when a requesting P2P node needs to download a certain resource...sending a query request for the resource to the P2P index server...receiving, by the P2P index server, a resource query request from the requesting P2P

node”), *see also id.*, 5, 7, 14, 17. The P2P index server represents a **content management server** connected to the **P2P device community** because the P2P index server receives queries from the P2P devices for resources. *Id.* The P2P index server is also connected to the **online server** represented by Li’s topology server, because the P2P index server can send identified resource P2P nodes to the topology server and receives “nearest neighbor” resource P2P nodes in return. *Id.*

151. The P2P index server performs “querying to obtain resource P2P nodes having the resource” when the P2P index server receives a query request for resources from a P2P node, which means that the P2P index server searches for P2P nodes having the requested resource. EX1007, 11, 14, 17. The P2P index server sends the list of resource P2P nodes to the topology server via the requesting P2P node, or directly sends the list of P2P nodes to the topology server based on this querying. EX1007, 8, 10, 16, 17, 18. The topology server returns the one or more “nearest neighbor” resource P2P nodes to the requesting P2P node via the P2P index server, or directly returns the one or more nearest neighbor resource P2P nodes to the requesting P2P node. *Id.* In other embodiments, the P2P index server sends the list of the resource P2P nodes to the requesting P2P node, and the requesting P2P node identifies the one or more “nearest neighbor” resource P2P nodes locally. EX1007, 7, 8, 10, 11, 16.

152. It is clear that Li's P2P index server includes a **search engine** because the P2P index server receives a query request for a certain resource and performs "querying" to identify one or more P2P nodes that include this resource. EX1007, 5 ("performing querying by means of a P2P index server to obtain a list of P2P nodes having the resource"), 7, 11, 14, 17. Li's P2P index server uses this **search engine** to perform the querying. *Id.* The P2P index server can use information included in the search request identifying the requested resource to search for the list of P2P nodes in an index as part of a process to identify the list of P2P nodes that host the requested resource. *Id.* Multiple references confirm that it was well known by the Critical Date of the '655 Patent to use a **search engine** of a **content management server** to search for P2P nodes hosting a requested resource. EX1014, [0055] (describing a peer to peer optimizer (PPO) including a "search amalgamation module 130" that maps the name of a "requested file" to "known files available"); EX1015, 8:60-9:4 (describing a "result server 104" that "acts as...a search engine" to identify names of files matching a search request).

153. It is clear that the P2P index server representing Li's **content management server** includes an **index database** that P2P index server searches to identify P2P nodes hosting a requested resource. EX1007, 5, 7, 10, 11, 14, 17. Li discloses that the server includes an **index database** identifying the resources stored by each P2P node because Li uses the word "index" in describing the "P2P index

server.” *Id.* Furthermore, the P2P index server includes an ***index database*** identifying the resources stored by each P2P node because Li explains that the P2P index server performs “querying to obtain a list of nodes having the resource.” *Id.* My opinion here is supported by multiple references confirming that it was well known by the Critical Date of the ’655 Patent for a ***content management server*** to include an ***index database*** indicating contents stored by one or more P2P devices. EX1016, [0039] (“describing a “cache memory 260” that “stores information about the content of hosts within the network”); EX1017 (describing a “shared item database 228” that “includes a plurality of entries corresponding to a plurality of items accessible to a plurality of devices via the plurality of clouds”).

154. The P2P index server includes a ***user’s device management unit*** because the P2P index server manages P2P nodes that output query requests for resources. EX1007, 5, 7, 11, 14, 17. For example, the “requesting P2P node” of Li represents a user’s device that sends a “resource query request” to the P2P index server. *Id.* Based on this resource query request, the P2P index server works with the topology server to generate a search result for output to the requesting P2P node based on this resource query request. Therefore, the P2P index server ***manages*** the manner in which the user’s device obtains resources. *Id.* Li’s P2P index server thus represents a ***content management server*** connected to a ***P2P device community*** and

an **online server**, the **content management server** including a **search engine**, an **index database**, and a **user's device management unit**.

Element [1d]: wherein the index database records the indexed data of each the P2P device of the P2P device community, the user's device management unit receives the search request sent from the user's device, the search engine searches the index database to generate a search result based on the search request and then returning the search result to the user's device,

155. Because Li's P2P index server obtains "a list" of P2P nodes having a resource in response to receiving a resource query request identifying the resource, the P2P index server includes an **index database** that records the **indexed data** corresponding to each P2P node computer that connects to the metropolitan area network. EX1007, 5, 7, 10, 11, 14, 17. The P2P index server differentiates between P2P nodes storing the resource and P2P nodes not storing the resource to obtain this list of P2P nodes. *Id.* This ensures that only P2P nodes storing the resource are included in the list. *Id.* The P2P index server thus represents a **content management server** including an **index server** recording **indexed data** of each **P2P device** of the **P2P device community**. *Id.*

156. Li expressly discloses that the **content management server** represented by the P2P index server receives a "resource query request" from a "requesting P2P node." *Id.* As I described in my analysis of Element [1pre], *supra*, the resource query request represents a **search request**. EX1007, 5, 7, 8, 10, 11, 14, 17. Furthermore, the requesting P2P node represents a **user's device**. *Id.* The resource query request

represents a **search request** that prompts the P2P index server to “obtain...resource P2P nodes having the resource.” *Id.* The P2P index server therefore **searches** the **index database** to identify the resource P2P nodes. *Id.* Furthermore, because Li explains that a P2P node can include a “user computer” that is connected to a building switch, it is clear that the requesting P2P node represents a **user’s device**. EX1007, 2, *see also id.*, 3 (“a user node downloads...file content”), 13. The P2P index server therefore receives a **search request** sent from the **user’s device**. EX1007, 5, 7, 8, 10, 11, 14, 17.

157. Li explains that the **search engine** represented by the P2P index server generates a **search result** by searching the **index database** stored by the P2P index server to obtain “a list of P2P nodes having [a] resource” in response to receiving a “resource query request” identifying the requested resource. EX1007, 5, 7, 8, 10, 11, 14, 17. Because the P2P index server obtains this list of P2P nodes through “querying,” it is apparent that the P2P index server includes an index server that is searchable to find the list of P2P nodes having the resource. *Id.* For example, the **search engine** consults the **index database** to differentiate between P2P nodes that host the requested resource and P2P nodes that do not host the requested resource to obtain the list of P2P nodes having the resource. *Id.*

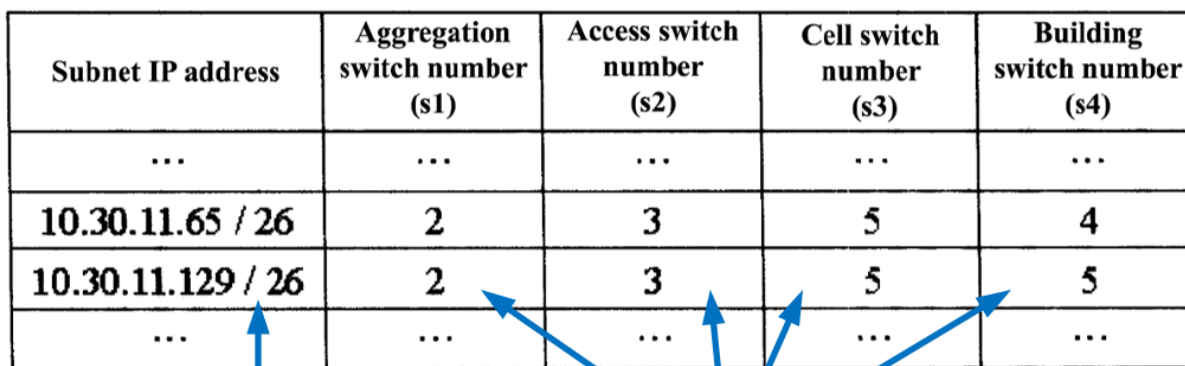
158. The P2P index server **returns** the **search result** including the list of resource P2P nodes to the requesting P2P node and sends the **search result** including

the list of resource P2P nodes to the topology server in some embodiments. EX1007, 7, 11, 17. Next, the topology server identifies “one or more nearest neighbor resource P2P nodes” and returns, either directly or via the P2P index server, the one or more nearest neighbor resource P2P nodes to the requesting P2P node. EX1007, 8, 10, 11, 16-18. In these embodiments, therefore, the P2P index server both **returns** the **search result** including the initial list of resource P2P nodes to the requesting P2P node and receives a list of the nearest neighbor resource P2P nodes from the topology server determined based on the initial list of resource P2P nodes. *Id.* In another embodiment, the P2P index server **returns** the **search result** including the list of resource P2P nodes to the requesting P2P device. EX1007, 7, 8, 10, 11, 16. Together with the **search result**, the P2P index server returns a location vector corresponding to each resource P2P node in the list of resource P2P nodes, thus allowing the requesting P2P device to determine one or more nearest neighbor resource P2P nodes based on the location vectors. *Id.* In each of these embodiments, a **search engine** of Li’s P2P index server generates a **search result** including a list of resource P2P nodes based on the **search request** and returns this **search result** to the requesting P2P node. EX1007, 7, 8, 10, 11, 16-18

Element [1e]: wherein the user’s device obtains the link data of the P2P device within the P2P device community according to the topology data table of the online server and the search result.

159. As I described in my analysis of Element [1b], *supra*, Li describes an **online server**—referred to by Li as a “topology server”—that stores a **topology data table** recorded with **link data** including a location vector for each P2P node connected to the metropolitan area network. EX1007, 6-10, 15-17, FIG. 4, FIG. 5. A location vector includes four values, including an “s1” value corresponding to an aggregation switch, an “s2” value corresponding to an access switch, an “s3” value corresponding to a cell switch, and an “s4” value corresponding to a building switch. EX1007, 6, 9, 15, FIG. 4, FIG. 5. The location vector $S = (s1, s2, s3, s4)$ corresponding to any two P2P nodes indicate **link data** for how those P2P nodes are connected to one another in the metropolitan area network because P2P nodes connect to building switches. *Id.*

Topology data table



The diagram shows a table with five columns: Subnet IP address, Aggregation switch number (s1), Access switch number (s2), Cell switch number (s3), and Building switch number (s4). The second row contains the values 2, 3, 5, and 4 for the IP address 10.30.11.65 / 26. The third row contains the values 2, 3, 5, and 5 for the IP address 10.30.11.129 / 26. Blue arrows point from the text 'Subnet IP address of each P2P node' to the first column, and from 'Link data' to the second, third, and fourth columns of the third row. An arrow also points from the title 'Topology data table' to the top of the table.

Subnet IP address	Aggregation switch number (s1)	Access switch number (s2)	Cell switch number (s3)	Building switch number (s4)
...	...	...	...	...
10.30.11.65 / 26	2	3	5	4
10.30.11.129 / 26	2	3	5	5
...	...	...	...	...

FIG. 5

Subnet IP address
of each P2P node

Link data

EX1007, FIG. 5 (annotated).

160. The topology server or the requesting P2P node uses the **link data** recorded in the topology data table to identify “one or more nearest neighbor resource P2P nodes” based on the “list of resource P2P nodes” identified by the P2P index server as hosting the requested resource. EX1007, 7, 10, 11, 14, 16. The topology server or the requesting P2P node uses a “calculation method” to compare the location vector of the requesting P2P node with the location vector of each identified resource P2P node to determine the one or more nearest neighbor resource P2P nodes. EX1007, 6, 9. Li explains that the topology server or the requesting P2P node can calculate a distance vector (e.g., $D = (d1, d2, d3, d4)$) by subtracting the location vector of a resource P2P node (e.g., $S' = (s', s', s', s'4)$) from the location vector of the requesting P2P node (e.g., $S = (s1, s2, s3, s4)$). EX1007, 6, 8, 9, 10, 16. This results in the topology server calculating a distance vector D between the requesting P2P node and each of the list of resource P2P nodes. *Id.* Because the distance vectors D are calculated by subtracting location vectors of the respective P2P nodes stored in the topology data table of the topology server, the distance vectors D represent **link data** just as the location vectors represent **link data**. *Id.*

161. Determining the one or more nearest neighbor resource P2P nodes next involves comparing the distance vectors D with one another to determine the resource P2P nodes that are “nearest” the requesting P2P node within the

metropolitan area network. EX1007, 6, 7, 9, 16. In some embodiments, a distance vector is smaller when more of the vector values are 0 and larger when more of the vector values are greater than zero. EX1007, 6, 8, 9, 10, 16. Li explains that in some embodiments, the topology server determines the one or more nearest neighbor resource P2P nodes based on the distance vectors D and returns these nearest neighbor resource P2P nodes to the P2P index server. EX1007, 7, 11, 17. Because the list of nearest neighbor resource P2P nodes indicates resource P2P nodes that are closest to the requesting P2P node within the metropolitan area network, this list of one or more nearest neighbor resource P2P nodes therefore includes **link data** because the list indicates one or more resource P2P nodes that are closest to the requesting P2P node within the metropolitan area network. EX1007, 6-11, 14-17. Li therefore explains that **link data** can include any one or combination of the location vectors corresponding to identified resource P2P nodes, distance vectors corresponding to links between resource P2P nodes, or a list of nearest neighbor resource P2P nodes indicating the closest nodes to the requesting P2P node. *Id.*

162. The P2P link server, in some embodiments, performs “querying to obtain the resource P2P nodes having the resource” to generate a search result, returns a **search result** including a list of the identified resource P2P nodes to the requesting P2P device, and sends the **search result** including the list of resource P2P nodes to the topology server. EX1007, 7, 8, 11, 17; *supra*, Element [1d]. This means

that the P2P link server both returns a search result including an initial list of P2P nodes to the requesting P2P device and sends this initial list to the topology server to identify nearest neighbors. *Id.* Indeed, as described above, the topology server can identify one or more nearest neighbor P2P nodes based on the location vectors recorded in the **topology data table** and return **link data** including the one or more nearest neighbor P2P nodes to the requesting P2P node. EX1007, 5, 6, 8-11, 16-18. The requesting P2P node therefore obtains **link data** comprising one or more nearest neighbor P2P nodes that are determined by the topology server according to the **search result** received from the P2P index server and the location vectors stored by the **topology data table**. *Id.*

163. Li describes other embodiments where each P2P node reports resources stored on the node and a location vector of the node to the P2P index server. EX1007, 7, 10, 17. Therefore, in some cases, the P2P index server stores a copy of the **topology data table**. *Id.* It is clear that the P2P index server generates a **search result** by performing “querying to obtain a list of nodes having the resource,” and returns the **search result** to the resource P2P node including “[t]he list of all resource P2P nodes obtained” that “*comprises a location vector of each resource node.*” EX1007, 8, *see also id.*, 10, 17, 18; *supra*, Element [1d]. The location vector of each resource P2P node is determined according to the **topology data table** stored by the topology server and represents **link data**. *Id.* The requesting P2P node performs the calculation

method to determine the one or more nearest neighbor P2P nodes based on this **search result** indicating the list of resource P2P nodes and the **link data** indicating the location vector of each resource P2P node. *Id.* The **user's device** obtains the **link data** according to the **topology data table** and the **search result** because Li's requesting P2P node (**user's device**) receives a **search result** identifying one or more resource P2P nodes, obtains **link data** including the location vector of each of these resource P2P nodes, and further obtains **link data** by calculating the one or more nearest neighbor P2P nodes. *Id.*

Claim [7]: The searching system of claim 1, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

164. Li describes techniques for “reporting, by each P2P node computer, a location vector of the P2P node computer while reporting a resource owned by the P2P node computer to a P2P index server.” EX1007, 10. As I described in my analysis of Elements [1a] and [1d], *supra*, each P2P node connected to Li's metropolitan area network stores **file data** comprising **content data** and **indexed data**. EX1007, 1-11, 14-17. In response to receiving “a resource query request for the resource” from a requesting P2P node, the P2P index server performs “querying” to “obtain P2P nodes having [a] resource.” EX1007, 11, *see also id.*, 5, 14, 17. This querying involves the P2P index server searching an **index database** recording the **indexed data** for each P2P node. *Id.* Querying results in the P2P index server

distinguishing between P2P nodes having the resource and P2P nodes not having the resource. *Id.* The P2P index server distinguishes between the P2P nodes having the resource and P2P nodes not having the resource because the **content management server** represented by the P2P index server includes a **network gathering module** for gathering **indexed data** from each P2P node indicating resources stored by that P2P node. *Id.*

Claim [8]: The searching system of claim 1, wherein the user's device connects to the P2P device according to the link data and downloads the file data based on the link data.

165. As I described in my analysis of Element [1e], *supra*, Li explains that the **user's device** represented by the requesting P2P node obtains **link data** according to a **topology data table** stored by the topology server. EX1007, 6, 8-10 15-18, FIG. 4, FIG. 5. This **link data** also depends on a **search result** indicating one or more P2P nodes having a requested resource. *Id.* The **user's device** represented by the requesting P2P node proceeds with “connecting to and downloading from the nearest connected resource P2P node.” EX1007, 11, *see also id.*, 5, 8-10 14, 17. It is therefore apparent that that the requesting P2P node **connects** to the **P2P device** corresponding to the resource P2P node and **downloads file data** from the P2P device. *Id.*

166. Furthermore, as I described in my analysis of Element [1e], *supra*, the requesting P2P node obtains **link data** from the **topology data table** according to one

embodiment of Li. EX1007, 8, 17, 18. This **link data** includes location vectors for each resource P2P node having a requested resource. *Id.* Based on the location vectors and proceeds to download the resource from the one or more nearest P2P nodes, the requesting P2P node determines one or more “nearest” P2P nodes. EX1007, 8, 17, 18. Li’s **user’s device** therefore **connects to** one or more resource P2P nodes and **downloads file data** from the one or more resource P2P nodes based on the **link data**. EX1007, 6, 8-10 15-18.

Claim [9]: The searching system of claim 1, wherein the user’s device connects to the P2P device based on the link data.

167. Li provides this claim element for at least the same reasons I described above in connection with Claim [8]. *See supra*, Claim [8].

Element [11pre]: A searching method for a P2P device community, applicable to a searching system for a P2P device community, the searching system includes at least one P2P device, an online server, and a content management server, the searching method comprising the steps of:

168. Li provides this claim element for at least the same reasons I described above in connection with Elements [1pre]-[1c]. *See supra*, Elements [1pre]-[1c].

Element [11a]: recording a link data of each the P2P device to generate a topology data table and storing the topology data table in the online server, wherein each the P2P devices respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

169. Li provides this claim element for at least the same reasons I described above in connection with Elements [1a]-[1b]. *See supra*, Elements [1a]-[1b].

Element [11b]: recording the indexed data of each the P2P device and storing the indexed data in an index database of the content management server;

170. Li provides this claim element for at least the same reasons I described above in connection with Elements [1c]-[1d]. *See supra*, Elements [1c]-[1d].

Element [11c]: receiving by the content management server a search request sent from a user's device and generating a search result by searching the index database based on the search request;

171. Li provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Element [1d].

Element [11d]: returning the search result to the user's device; and

172. Li provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Element [1d].

Element [11e]: obtaining the link data of the P2P device within the P2P device community by the user's device according to the topology data table of the online server and the search result.

173. Li provides this claim element for at least the same reasons I described above in connection with Element [1e]. *See supra*, Element [1e].

Claim [16]: The searching method of claim 11, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

174. Li provides this claim element for at least the same reasons I described above in connection with Claim [8]. *See supra*, Claim [8].

Claim [18]: The searching method of claim 17, further comprising the steps of: connecting to the P2P device and downloading the file data by the user's device based on the link data.

175. Li provides this claim element for at least the same reasons I described above in connection with Claim [8]. *See supra*, Claim [8].

Claim [19]: The searching method of claim 11, further comprising the steps of: connecting to the P2P device by the user's device based on the link data.

176. Li provides this claim element for at least the same reasons I described above in connection with Claim [9]. *See supra*, Claim [9].

E. The Li-Rose Combination Renders Claims 1, 7-11, and 16-19 Obvious

Element [1pre]: A searching system for a P2P (peer-to-peer) device community, for receiving a search request sent from at least one user's device, the searching system comprising;

177. The Li-Rose combination discloses and renders obvious Element [1pre] for at least the same reasons that I addressed above in connection with Ground 2A (§X.F) at Element [1pre]. *See supra*, Ground 1A (§X.F) at Element [1pre].

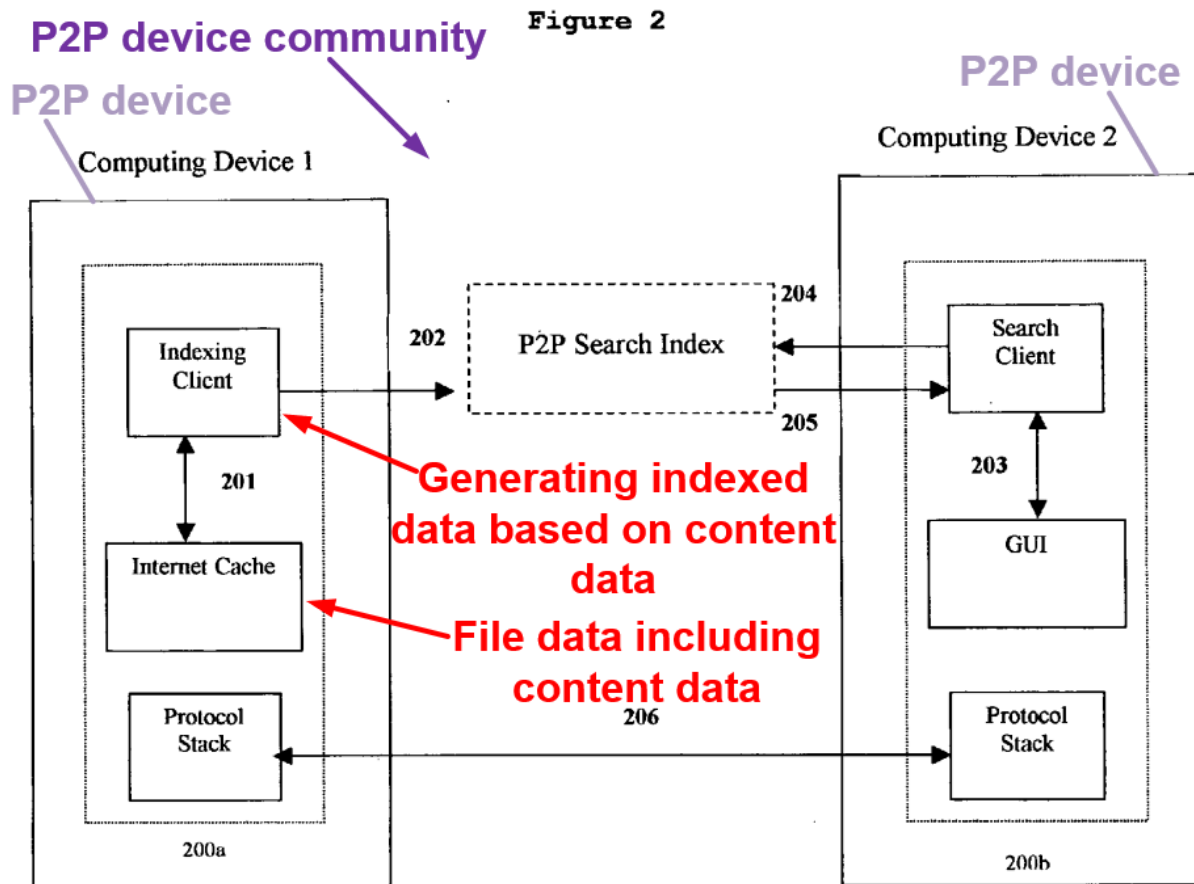
Element [1a]: at least one P2P device community, wherein each the P2P device community includes at least one P2P device, wherein each the P2P device respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

178. The Li-Rose combination discloses and renders obvious Element [1a] for at least the same reasons that I addressed above in connection with Ground 2A (§X.F) at Elements [1a]. Li describes a metropolitan area network including a ***P2P device community*** having “P2P node computers” having ***file data*** that is downloaded by other P2P node computers within the network. EX1007, 2, 3, 5-10, 12, 14-18, FIG. 4. To the extent Li does not expressly disclose that the ***file data***

stored by each P2P node computer comprises both **content data** and **indexed data**, such features would have been obvious and provided in the Li-Rose combination. EX1008, [0026]-[0030], [0038], [0039], FIG. 1, FIG. 2; *supra*, §IX.H.

179. Rose describes “computing devices” that serve as **P2P devices** within a **P2P device community**. EX1008, [0024]-[0028], [0038]-[0040], [0043], FIG. 1, FIG. 2. Each computing device stores **file data** including **content data** downloaded by other computing devices because computing devices “share files located on their own hard drives as well as to search and download files from other computers.” EX1008, [0030], *see also id.*, [0044]. Furthermore, Rose explains that each computing device includes an “indexing module” that can “periodically search a plurality of folder(s)” on the P2P device “to identify cached versions of data having network addresses associated thereto.” EX1008, [0027], [0028], *see also id.*, [0038].

180. The indexing module of the computing device creates **indexed data** based on the **content data** of each file by extracting “identifying information from the files, extracts network address information from the files, and generates an index.” EX1008, [0029], *see also id.*, [0038]. It is clear that in the Li-Rose combination, each **P2P device** in the **P2P device community** therefore stores **file data** comprising **content data** and **indexed data**. EX1008, [0024]-[0030], [0038]-[0040], [0043], FIG. 1, FIG. 2; *supra*, §IX.H.



EX1008, FIG. 2 (annotated).

Element [1b]: at least one online server connecting to the P2P device community, each the online server includes a topology data table, the topology data table being recorded with a link data between each of the P2P devices of the P2P device community; and

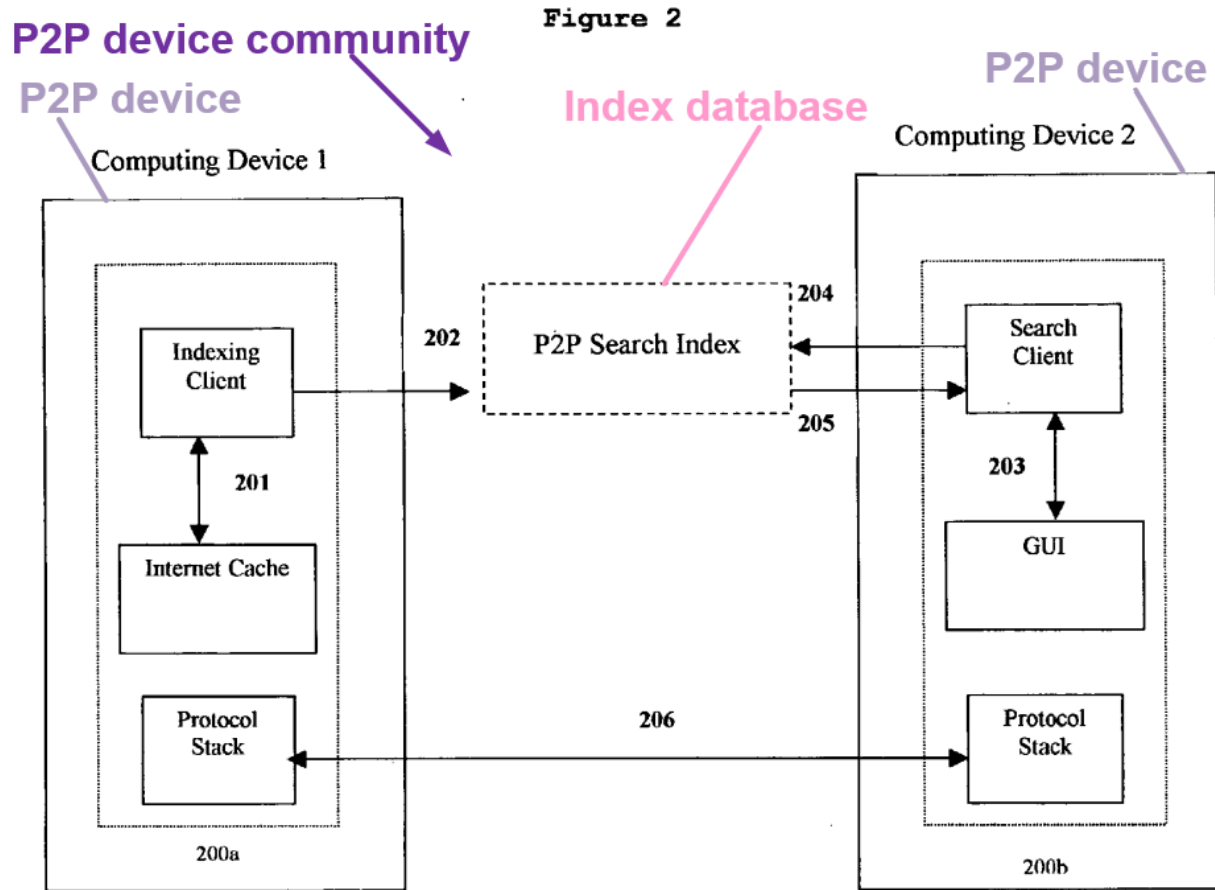
181. The Li-Rose combination discloses and renders obvious Element [1pre] for at least the same reasons that I addressed above in connection with Ground 2A (§X.F) at Element [1b]. See *supra*, Ground 1A (§X.F) at Element [1b].

Element [1c]: at least one content management server connecting to the P2P device community and the online server respectively, each the content management server includes a search engine, an index database, and a user's device management unit,

182. The Li-Rose combination discloses and renders obvious Element [1c] for at least the same reasons that I addressed above in connection with Ground 2A (§X.F) at Elements [1c]. For example, Li’s “P2P index server” represents a **content management server** that connects to one or more P2P node computers representing a **P2P device community** and connects to an **online server** that Li refers to as a “topology server.” EX1007, 1, 5, 7-11, 14, 17; *supra*, §V.D.2 (Element [1c]). Even if Li does not expressly disclose that the **content management server** includes a **search engine** and an **index database**, such features would have been obvious and provided in the Li-Rose combination. EX1008, [0052], [0053], [0056], [0058]-[0061]; *supra*, § IX.H.

183. Rose describes one embodiment where each computing device representing a **P2P device** in a **P2P device community** generates **indexed data** for one or more files that are available for downloading by other computing devices. EX1008, [0024]-[0030], [0038]-[0040], [0043], FIG. 1, FIG. 2; *supra*, Element [1b]. According to Rose, the computing device sends this **indexed data** to a “search index of a P2P network...to integrate the indexed cached data into a larger local or regional P2P index.” EX1008, [0029], *see also id.*, [0006], [0007], [0038]. Rose explains that the search index can be stored on a “regional node” that is separate from the computing device, which means that Rose expressly discloses that the search index

can be stored on a server (e.g., a *content management server*). EX1008, [0006], [0007], [0038], FIG. 2.



EX1008, FIG. 2 (annotated).

184. The search index of Rose therefore represents an *index database* that can be stored by a *content management server* connected to the *P2P device community* because the “larger local or regional P2P index” of Rose is stored separately from the *P2P devices* in the *P2P device community* and incorporates indexed data from multiple computing devices. EX1008, [0006], [0007], [0026]-[0029], [0038]-[0041], FIG. 1, FIG. 2. It is also apparent that the same regional node

storing the search index also comprises a **search engine** because Rose describes a “search index” as including “an associated software application that searches the index for...links matching...search criteria,” in response to receiving a search query from one of the computing devices in the **P2P device community**. EX1008, [0040], *see also id.*, [0029], [0030].

185. To ensure that Li’s P2P index server receives accurate and up-to-date information indicating the content hosted by each P2P node computer and processing requests to identify this content, a POSITA would have been motivated to implement Li’s P2P index server with an **index database** including **indexed data** for files stored by each **P2P device** of a **P2P device community** and a **search engine** for identifying content using the **index database**. EX1008, [0006], [0007], [0026]-[0029], [0038]-[0041], FIG. 1, FIG. 2; *supra*, § IX.H. Consequently, the predictable Li-Rose combination includes a **content management server** including a **search engine** and an **index database**. *Supra*, § IX.H.

Element [1d]: wherein the index database records the indexed data of each the P2P device of the P2P device community, the user’s device management unit receives the search request sent from the user’s device, the search engine searches the index database to generate a search result based on the search request and then returning the search result to the user’s device,

186. As I described in my analysis of Element [1b], *supra*, Rose describes an **indexed database** that stores **indexed data**. EX1008, [0006], [0007], [0026]-[0029], [0038]-[0041], FIG. 1, FIG. 2. It is apparent that the **indexed data** recorded

by the ***indexed database*** includes information identifying one or more cached files stored by each computing device of Rose's ***P2P device network***. EX1008, [0006], [0007], [0026]-[0029], [0038]-[0041], FIG. 1, FIG. 2. For example, Rose explains that a P2P device includes an "indexing module" that can "periodically search a plurality of folder(s)" on the P2P device "to identify cached versions of data having network addresses associated thereto," therefore indicating that the indexed data specifically identifies content stored by each ***P2P device*** of the ***P2P device community***. EX1008, [0027], [0028], *see also id.*, [0038]. Rose also explains that the indexing module "extracts identifying information from the files, extracts network address information from the files, and generates an index." EX1008, [0029], *see also id.*, [0038]. In the predictable Li-Rose combination, the ***indexed database*** therefore records ***indexed data*** of each ***P2P device*** of the ***P2P device community***. *Supra*, § IX.H.

Element [1e]: wherein the user's device obtains the link data of the P2P device within the P2P device community according to the topology data table of the online server and the search result.

187. The Li-Rose combination discloses and renders obvious Element [1pre] for at least the same reasons that I addressed above in connection with Ground 2A (§X.F) at Element [1e]. *See supra*, Ground 1A (§X.F) at Element [1e].

Claim [7] The searching system of claim 1, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

188. Even if Li does not expressly disclose that the **P2P devices** or the **content management server** generates the **indexed data**, such features would have been obvious and provided in the Li-Rose combination. EX1008, [0026]-[0029], [0038], [0039], FIG. 1, FIG. 2; *supra*, § IX.H. Rose explains that the **indexed data** can be created by the **P2P devices** themselves because Rose expressly discloses **P2P devices** within a P2P device community each include an “indexing module” that generates **indexed data** for files stored on the P2P device by extracting “information in the file, including words, images, links, source, or other information.” EX1008, [0029], *see also id.*, [0027], [0028], [0038], [0039].

Claims [8]-[9]:

Claim [8] The searching system of claim 1, wherein the user’s device connects to the P2P device according to the link data and downloads the file data based on the link data.

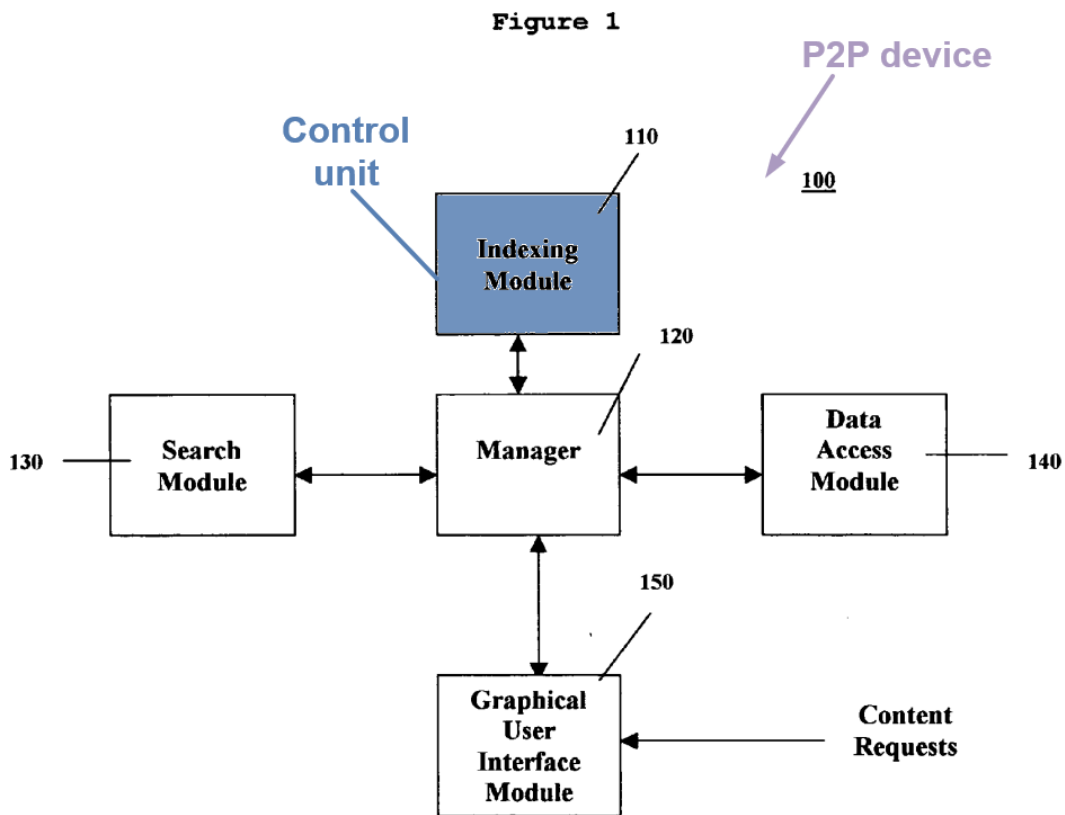
Claim [9]: The searching system of claim 1, wherein the user’s device connects to the P2P device based on the link data.

189. The Li-Rose combination discloses and renders obvious Claims [8]-[9] for at least the same reasons that I addressed above in connection with Ground 2A (§X.H) at Claims [8]-[9]. *See supra*, Ground 12 (§X.H) at Claims [8]-[9].

Claim [10]: A P2P device applicable to the searching system of claim 1, comprising: a control unit controlling the file data being an open state or a hidden state.

190. As I described in my analysis of Element [1a], *supra*, Rose describes a **P2P device community** including one or more “computing devices” that each store

file data comprising **content data** and **indexed data**. EX1008, [0026]-[0030], [0038], [0039], FIG. 1, FIG. 2. Rose expressly discloses that that each computing device includes an “indexing module” that generates the **indexed data** for cached data files stored by the computing device. EX1008, [0027]-[0029], [0038], [0039]. The indexing module represents a **control unit** that controls the **file data** for the **P2P device** corresponding to the computing device because the indexing module manages the indexing of the cached data files. EX1008, [0027]-[0029], [0038], [0039].



EX1008, FIG. 1 (annotated).

191. The **control unit** controls **file data** to occupy an **open state** or a **hidden state** because Rose explains that each computing device “provides access to

unrestricted sources of content and, if desired, *closed* or *restricted* access as well.” EX1008, [0048], *see also id.*, [0013], [0049], [0050]. Furthermore, the P2P device’s **control unit** controls **file data** revealing personal information of the user to be in the **hidden state** because “the method of indexing cached network files includes the step of ignoring personal identification information of a user or deleting personal identification information of a user.” EX1008, [0013]. Rose also explains that the **control unit** causes personal information to occupy the **hidden state** “by not allowing such information to be indexed and thereby become a part of the global distributed index,” which is very similar to the manner in which the ’655 Patent controls file data to be in the hidden state. EX1008, [0049]; *cf.* EX1001, 7:11-27 (explaining that when file data occupies the hidden state, the system does not create indexed data for this file data.). Consequently, the predictable Li-Rose combination provides or renders obvious a **P2P device** including a **control unit** for controlling **file data** to occupy an **open state** or a **hidden state**. *supra*, §IX.H.

Element [11pre]: A searching method for a P2P device community, applicable to a searching system for a P2P device community, the searching system includes at least one P2P device, an online server, and a content management server, the searching method comprising the steps of:

192. The Li-Rose in connection with Elements [1pre]-[1c]. *See supra*, Elements [1pre]-[1c].

Element [11a]: recording a link data of each the P2P device to generate a topology data table and storing the topology data table in the online server,

wherein each the P2P devices respectively comprises at least one file data, and each the file data comprises a content data and an indexed data;

193. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Elements [1a]-[1b]. *See supra*, Elements [1a]-[1b].

Element [11b]: recording the indexed data of each the P2P device and storing the indexed data in an index database of the content management server;

194. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Elements [1c]-[1d]. *See supra*, Elements [1c]-[1d].

Element [11c]: receiving by the content management server a search request sent from a user's device and generating a search result by searching the index database based on the search request;

195. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Elements [1d].

Element [11d]: returning the search result to the user's device; and

196. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Element [1d]. *See supra*, Elements [1d].

Element [11e]: obtaining the link data of the P2P device within the P2P device community by the user's device according to the topology data table of the online server and the search result.

197. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Element [1e]. See *supra*, Elements [1e].

Claim [16]: The searching method of claim 11, wherein the indexed data can be created by the P2P devices themselves, or the indexed data can be created by the content management server gathering from the P2P devices via a network gathering module.

198. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Claim [7]. See *supra*, Claim [7].

Claim [17]: The searching method of claim 11, further comprising the step of: controlling a file data of each the P2P device being an open state or a hidden state.

199. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Claim [10]. See *supra*, Claim [10].

Claim [18]: The searching method of claim 17, further comprising the steps of: connecting to the P2P device and downloading the file data by the user's device based on the link data.

200. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Claim [8]. See *supra*, Claim [8].

Claim [19]: The searching method of claim 11, further comprising the steps of: connecting to the P2P device by the user's device based on the link data.

201. The Li-Rose combination provides this claim element for at least the same reasons I described above in connection with Claim [9]. See *supra*, Claim [9].

F. The Li-Rose-Schwan Combination Renders Claims 2-4, 12, and 13 Obvious

Claim [2]: The searching system of claim 1, wherein each the P2P device includes a weighted data, and the content management server is provided with a sorting algorithm module creating the weighted data based on the link data associated with the P2P device, the search result being sorted by the order of the weighted data of the P2P device so as to generate a sorted search result.

202. To determine the “nearest neighbor” resource P2P node, Li’s system can calculate a “distance vector $D = (d1, d2, d3, d4)$ ” for each resource P2P node by subtracting the “location vector $S' = (s'1, s'2, s'3, s'4)$ ” of the resource P2P node from the “location vector $S = (s1, s2, s3, s4)$ ” of the requesting P2P node. EX1007, 9, *see also id.*, 6, 16. These distance vectors indicate how close each resource P2P node is to the requesting P2P node within the metropolitan area network because the distance vector between each resource P2P node and the requesting P2P node represents ***weighted data*** for that resource P2P node. *Id.* Li describes a ***sorting algorithm module*** that creates the ***weighed data*** based on ***link data*** because the distance vectors are calculated using ***link data*** including the location vector of the requesting P2P node and the location vectors of each resource P2P node identified by the P2P index server. *Id.*

203. It would have been obvious to implement Li’s P2P index server (***content management server***) with a ***sorting algorithm module*** for creating the distance vectors based on the suggestions of Schwan, even if Li’s P2P index server does not include this sorting algorithm module. EX1007, [0028]-[0039], FIG. 2;

supra, §IX.I. A POSITA would have been motivated to implement Li's P2P index server with a **content management server** for generating the distance vectors because Schwan describes a **content management server** represented by tracker node 20 and an **online server** represented by P2P manager 30 and explains that "peer-to-peer manager 30 communicates [] relevant topology information for the tracker node 20 to directly generate [a] optimized list in accordance with predefined rules." EX1007, [0036]; *supra*, §IX.I

Claim [3]: The searching system of claim 2, further comprising: a weight look-up table recorded with the weighted data of each the P2P device, wherein the weight look-up table is stored in the content management server, the online server, or a storage device.

204. Li describes a **weight look-up table** including the information for completing the size comparison method including a table entry corresponding to each distance vector because Li describes a "calculation method for searching for the nearest neighbor resource P2P node" that involves calculating a distance vector for each resource P2P node and a "size comparison method" for comparing distance vectors to determine the nearest neighbors. EX1007, 6, 7, 9, 10, 16, 17. It is clear that a POSITA would have been motivated to implement Li's P2P index server with a **weight look-up table** recorded with the **weighted data** based on Schwan's suggestion for a **content management server** to generate an optimized list of P2P devices. EX1007, [0036]; *supra*, § IX.I.

Claim [4]: The searching system of claim 2, wherein the sorting algorithm module performs a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result, and the weighted search result is sorted by the order of the weighted search results so as to generate a weighted and sorted search result.

205. Li describes a ***function operation*** including a “calculation method” that is performed to ***sort*** a list of resource P2P nodes identified by the P2P index server as including a requested resource. EX1007, 6, 7, 9, 10, 16, 17. This ***function operation*** involves comparing the distance vectors identified by the ***sorting algorithm module***. *Id.* Specifically, Li explains that the function operation includes a “size comparison method” for determining the larger of a pair of distance vectors “ $D = (d1, d2, d3, d4)$ and $D' = (d'1, d'2, d'3, d'4)$.” *Id.* Li describes determining a ***weighted and sorted search result*** including the nearest neighbor P2P nodes sorted by size so that the smallest distance vectors are the “nearest” to perform this ***function operation***. *Id.*

Claim [12]: The searching method of claim 11, further comprising the steps of: creating a weighted data associated with each the P2P device by the content management unit based on the link data of the P2P devices; performing a function operation based on the search result and the weighted data corresponding to the P2P device to generate a weighted search result; and sorting the weighted search result based on the order of the weighted search results to generate a weighed and sorted search result.

206. The Li-Rose-Schwan combination provides this claim element for at least the same reasons I described above in connection with Claims [2] and [4]. See *supra*, Claims [2] and [4].

Claim [13]: The searching method of claim 12, further comprising the steps of: recording the weighted data of the P2P devices to generate a weight look-up table; and storing the weight look-up table in the content management server, the online server, or a storage device.

207. The Li-Rose-Schwan combination provides this claim element for at least the same reasons I described above in connection with Claim [3]. See *supra*, Claim [3].

G. The Li-Rose-Strickland Combination Renders Claims 5, 6, 14, and 15 Obvious

Claims [5]-[9]

Claim [5]: The searching system of claim 1, wherein the user's device management unit includes a user-charge module, and wherein after confirming that the user's device has been charged, the content management server provides the search result, or the online server provides at least one of the link data of the P2P device, to the user's device.

Claim [6]: The searching system of claim 5, wherein the user charge module receives a user's identity data, a charging data, a charging-mode data, or a payment confirmation data, all of which being sent from the user's device.

Claim [14]: The searching method of claim 11, further comprising the steps of: providing the search result by the content management server, or providing at least one link data of the P2P device by the online server, to the user's device by the content management server confirming that the user's device has been charged.

Claim [15]: The searching method of claim 14, wherein the content management server confirming that the user's device has been charged comprises the steps of: confirming a user's identity data of the user's device; receiving a charge-mode data sent from the user's device; confirming a payment confirmation data sent from the user's device; and recording a pricing data required for connection or down loading requested by the user's device.

208. The Li-Rose-Strickland combination discloses and renders obvious Claims [5]-[6] and [14]-[15] for at least the same reasons that I addressed above in connection with Ground 1C (§X.H) at Claims [5]-[6] and [14]-[15]. *See supra*, Ground 12 (§X.C) at Claims [5]-[6] and [14]-[15].

XI. CONCLUSION

209. For all the reasons I have noted in the foregoing paragraphs, claims 1-19 of the '655 Patent are obvious in view of the references discussed above.

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

APPENDIX A

Expert Witness, CTO

Technology industry veteran with electronics/software/hardware/video/audio/data expertise.

IoT | Consumer Electronics | Telecommunications | Cable | Satellite | Broadband | Wireless

- Expert witness testimony (PTAB, ITC), technical consulting, and expert reports for renowned patent law firms such as Fish & Richardson and Banner Witcoff.
- 117 Patents and Patent publications. Served on corporate patent boards and as 30(b)(6) witness.
- Uniquely broad hardware/software/systems technical understanding.
- Award winning design and development including Best of Show, Technology Emmy, and Best of Innovations of over 100 million shipped products, responsible for \$1.3B annual revenue.
- Industries: Consumer Electronics, Cable, Satellite, Internet of Things (IoT), Telematics, Smart Truck Logistics, Transportation, Alarm Systems, Smart Tank monitoring & fulfillment, Smart Home, Television, Telecommunications, Video, Audio, Wireless, Broadband, OTT Video, IPTV, Payments
- Technical: hardware design, software design, systems design, mechanical design, embedded systems, cloud computing, AWS, Azure, Oracle Cloud Infrastructure (OCI), SaaS, edge computing, high speed digital, C, Java, Python, Linux, mobile applications (iOS, Android, cross-platform), web applications (Java, JavaScript, HTML), firmware, RTOS, user interfaces, UI/UX, video, audio, data, RF, DSP, communications, cybersecurity, encryption, error correction coding, real-time systems, cable, CATV, DOCSIS, broadband, satellite, satcom, IPTV, OTT video, video streaming, image processing, wireless, cellular, 3G, 4G, LTE, LTE-M, 5G, NB-IoT, Cat-M1, WiFi, ZigBee, Z-Wave, Bluetooth, BLE, LoRa, Internet of Things (IoT), IIoT, sensors, Machine-to-Machine (M2M), Telematics, AI, ML, networks, payments, consumer electronics, and telecommunications.

EXPERIENCE

Nov. 2016-present, **Expert Witness/CTO**, Independent Consultant

Technology, product development, organizational, & intellectual property consulting

- Expert Witness Reports and Testimony - Declarations, Opinions, PTAB Inter Partes Review (IPR) Petitions and Defense, Depositions
- Intellectual Property/Patent assistance, prosecution/defense strategy, search
- Technical Consulting

Jul. 2019 – June 2022, **Chief Technology Officer (CTO)**, **Telular**, an Ametek Company, Greater Atlanta Area

- Responsible for global engineering, corporate technical strategy, and technical representation.
- Developed SaaS, mobile, and hardware products for Industrial IoT (IIoT) businesses including transportation, tank monitoring, petroleum logistics, and facility alarm monitoring with 1.4M+ subscribers, sold under the SkyBitz and Telguard brands.
- Led the development of an IoT Toolkit (scalable platform and APIs) to extend the Telular IoT platform for all 60+ (and growing) AMETEK companies, enabling development of high- value IIoT recurring revenue web and mobile applications.
- SaaS, Cellular, 3G, 4G, LTE, LTE-M, 5G, NB-IoT, Cat-M1, BLE, Satellite, cloud, distributed systems, Azure, Oracle Cloud, IoT, telematics, AI, ML, M2M, hardware, GPS, solar, low-power design, broadband, firmware, software, systems, architecture, video, image processing, mobile apps, web apps.

Aug. 2011 – Oct. 2016, **Vice President of Engineering, Head of the Atlanta R & D Center, EchoStar Technologies**, Greater Atlanta Area (\$3B revenue, Engineering for Dish Network with a common controlling stockholder)

- Developed products for Dish Network and international customers including highest volume set-top boxes, H.265, HEVC, 3D, Satellite, MoCA, transcoding, Embedded C Linux applications, mobile applications (iOS and Android), SaaS, and web applications (Javascript, HTML). Provided product lifecycle support of contract manufacturers, test methodologies, customer service, QA, marketing, and sales.

- Led the architecture and global development of a huge end-to-end secure IoT cloud/fog/edge Platform for the consumer security & smart home market and other adjacent markets. Established the unique TV and mobile UI and MyLocal911 patented self-monitored security paradigm. System architecture consisted of 32 cloud systems and 24 CPE products. Systems included BSS/OSS, AWS cloud storage, 2-way video/audio streaming, authentication, provisioning, software download, command and control, customer service, online storefront, 911 emergency VoIP, logistics, CPE, and mobile applications. Represented the platform at trade shows.
- Functioned as a general manager in roles and responsibilities including vision, operations, business results, product management, program management, complex projects and services, hardware/software/systems product development of video, Internet of Things (IoT), and mobile application products.
- **Winner of the prestigious Best of Show award at the 2013 CES for the Hopper** because of the Hopper Transfers functionality and mobile applications.
- **Won 2015 CSI award “Best smart home product, technology or service”.**

Aug. 1990 – July 2011, **Vice President of Engineering, Cisco / Scientific Atlanta**, Greater Atlanta Area (\$35B / \$1.9B revenue companies respectively. Cisco acquired Scientific Atlanta Feb. 2006)

- Intellectual property – served on the corporate patent board, provided patent assistance, and testified in patent litigation cases including as a 30(b)(6) witness representing the corporation.
- Responsible for the hardware/firmware/software/mechanical/systems/architecture/ASIC requirements design and development of several generations of high volume set top boxes and other products with extensive data communications and multimedia capabilities and advanced features including DOCSIS 1/2/3 and hybrid gateways, 802.11, IPTV, DVR, cable modems, ADSL, VDSL, DVB-T/C/S, bootloaders, factory diagnostics, application frameworks, Nagra, DRMs, conditional access, secure microprocessors, device management, Android, Adobe Flash, Linux, DVD play/record, MPEG-4, MPEG-2, H.264, NTSC, PAL, DAVIC, MoCA, high-performance CPUs, cablecards, network processors, HDMI, multiple video/audio display interfaces, 2D/3D graphics, multiple RF tuners, and full spectrum tuners.
- Products developed supported worldwide video, audio, power supply, and regulatory standards.
- Developed products manufactured in company factories, contract manufacturers (CMs), Original Design Manufacturers (ODMs), and Joint Design Manufacturers (JDMs).
- Developed processes and practices to ensure success in high quality, high volume, low cost, and fast time-to-market product development.
- Architected Video-On-Demand (VOD) systems.
- Architected robust software download system to ensure network disaster recovery to avoid truck rolls. Received some of the **industries’ first downloadable software patents and an electronic program guide patent**. Developed the downloadable software system, enabling the applications software development business which evolved into a major corporate strategic business objective.
- Responsible for the total value proposition strategy internally in the organization through process design and externally facing customers to propose innovative solutions that add value and differentiate our offering.
- Established and managed department capex and opex budgets and manpower planning.
- Achieved unprecedented 3%/qtr product cost reductions for all products during the product lifecycle.
- Highly reliable products never had a field recall, which would have been disastrous to the business due to truck roll costs.
- Established software development department and software development practices including software processes, code reviews, networked version control and defect tracking, unit test teams, coding standards, and release processes.
- Reduced product development time to market for set top boxes from 14 months to 6 months through continuous process improvement
- Scaled organization from supporting \$10M to \$1.3B in sales
- Accounted for more than **70% of the revenues for Cisco’s Service Provider Video Technology Group and for Scientific Atlanta Corporation**.
- Award winning design and development of over 100 million shipped products
- **Winner of Technology Emmy in 2012 for Pioneering Development of Multi-Room DVR.**

- **Winner of 2006 CES "Best of Innovations" award for DVR/DVD Recorder/Player.**
- **Winner of Motorola/EE Times Excellence in Innovation Award** in 1994.

Nov. 1985 - July 1990, **Hardware Engineering Manager / Senior Engineer, Wegener Communications, Inc.,** Greater Atlanta Area

- Managed product development of video, audio, and data satellite receivers, modulators, graphics display systems, DSP-based companders, FSK and PSK satellite modems, multiplexers, forward error correction (FEC) codecs, RF upconverters and downconverters, and baseband analog and digital processing components. Disciplines managed included hardware, ASICs, FPGAs, RF, digital, microprocessors, analog, mechanical, and embedded software.
- Architected and designed forward error correction (FEC) coding systems, PSK modems, and analog control systems for RF modulators and PSK demodulators.

Mar. 1983 - June 1985 (while working at Scientific Atlanta), Assistant Professor, **DeVry Institute of Technology,** Greater Atlanta Area

- Taught evening school courses in microprocessor hardware/software and Electronics

June 1982 – Oct. 1985, **Scientific-Atlanta, Engineer II/Engineer I,** Greater Atlanta Area

- Designed software and hardware including addressable data transmitters, video sync suppression scramblers, transaction format converters, and data channel monitors for addressable Cable Television systems and Set Top Boxes.

EDUCATION

- MSEE course work in Electrical Engineering, Georgia Institute of Technology, Atlanta, Georgia
- BSEE, University of Tennessee, Knoxville, Tennessee, with High Honors. Specialization in Computer Engineering. GPA: 3.53/4.00.
- Georgia Institute of Technology Scrum Leadership Certificate, Certified Scrum Master (CSM), Certified Scrum Product Owner (CSPO), Certified Large Scale Scrum (LeSS) Practitioner
- Many short courses in business and engineering.