

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DROPBOX, INC.,
Petitioner,

v.

ENTANGLED MEDIA, LLC
Patent Owner.

Case No. IPR2024-00284
U.S. Patent No. 8,296,338

PETITION FOR *INTER PARTES* REVIEW OF

U.S. PATENT NO. 8,296,338

CHALLENGING CLAIMS 1-14

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	MANDATORY NOTICES	1
	A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1)):	1
	B. Related Matters (37 C.F.R. §42.8(b)(2)):	1
	C. Lead Counsel (37 C.F.R. §§42.8(b)(3) & 42.10):	1
	D. Service (37 C.F.R. §42.8(b)(3)-(4)):	2
III.	SUMMARY OF THE '338 PATENT	2
	A. Brief Description of the '338 Patent	2
	B. Summary of the Prosecution History of the '338 Patent	4
IV.	THE PRIOR ART	5
	A. Aboulhosn	5
	B. Phillips	5
	C. Shappell	6
	D. Tsang	6
V.	REQUIREMENTS FOR <i>INTER PARTES</i> REVIEW UNDER 37 C.F.R. §42.104.....	6
	A. Grounds for Standing 37 C.F.R. §42.104(a) and Fees.....	6
	B. Identification of Challenge Under 37 C.F.R. §42.104(b) and Relief Requested.....	7
VI.	DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE.....	7
	A. §325(d)	7
	B. §314(a).....	9
VII.	LEVEL OF ORDINARY SKILL	9
VIII.	CLAIM CONSTRUCTION	10
	A. Terms to Be Construed.....	10
	1. “web-based system”	10
IX.	GROUND 1: CLAIMS 1-2 AND 5-14 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS.....	11
	A. Claim 1	11

1.	1[P]: “A process for establishing a singular file system across multiple devices”	11
2.	1[A]: “receiving user information to open an account for establishing a singular file system across multiple devices via a web-based system that includes at least one server”.....	14
3.	1[B]: “installing an individual software client on each of the multiple devices via the web-based system”	20
4.	1[C]: “accepting registration of multiple devices via the web-based system”	24
5.	1[D]: “scanning each of the multiple devices by each of the individual software clients to inventory data on each of the multiple devices and create a meta-index of the files for the inventoried data”	26
6.	1[E]: “providing by the individual software clients via the multiple devices individual meta-indices of the inventoried data for each of the multiple devices to the at least one server”	30
7.	1[F]: “integrating by the at least one server the individual meta-indices to create a single master meta-index”	31
8.	1[G]: “providing by the at least one server [i] the single master meta-index and [ii] meta-indices for each of the other multiple devices to each of the multiple devices via the individual software clients”	35
9.	1[H]: “integrating metadata from the meta-indices of each of the other multiple devices into a local file system of each of the multiple devices to generate virtual files stored in the same locations as local files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices”	39
10.	1[I]: “continually updating the single master meta-index on the at least one server and each of the multiple devices in response to changes to the data indexed thereon”	47

11.	1[J]: “wherein the individual software clients facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index by modifying file systems of each of the multiple devices to include virtual files for data from the single meta-data index that is not local to a multiple device.”.....	50
B.	Motivation to Combine Aboulhoshn and Phillips.....	53
C.	Claim 2	61
D.	Claim 5	62
E.	Claim 6	63
F.	Claim 7	64
1.	7[P]: “A system for establishing a singular file system across multiple devices”	64
2.	7[A]: “a web-accessible server”.....	64
3.	7[B]: “at least one software client plug-in”	65
4.	7[C]: “multiple devices for storing and operating on files”	66
5.	7[D]	66
6.	7[E].....	67
7.	7[F].....	67
8.	7[G]	68
G.	Claim 8	68
H.	Claim 9	68
I.	Claim 10	68
1.	10[P]: “A non-transitory computer-readable storage medium storing a set of instructions that, when executed by a processor, cause the processor to perform operations”	68
2.	10[A-E]	69
J.	Claim 11	70
K.	Claim 12	70
L.	Claim 13	71

M.	Claim 14	71
X.	GROUND 2: CLAIMS 3-4 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS AND TSANG	72
A.	Claim 3	72
B.	Claim 4	76
C.	Motivation to Combine Aboulhosn-Phillips with Tsang	76
XI.	GROUND 3: CLAIMS 1-2 AND 5-14 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS AND SHAPPELL	80
A.	Claims 1-2, 5, and 7-14	80
B.	Motivation to Combine Aboulhosn-Phillips with Shappell	81
C.	Claim 6	83
XII.	GROUND 4: CLAIMS 3-4 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS, TSANG AND SHAPPELL	84
XIII.	CONCLUSION.....	85

PETITIONER'S EXHIBIT LIST

Exhibit	Description
Ex-1001	U.S. Patent No. 8,296,338 (the “’338 patent”)
Ex-1002	File History of the ’338 patent
Ex-1003	Declaration of Dr. Patrick McDaniel
Ex-1004	CV of Dr. Patrick McDaniel
Ex-1005	U.S. Patent No. 6,938,042 (“Aboulhosn”)
Ex-1006	U.S. Patent No. 7,058,696 (“Phillips”)
Ex-1007	U.S. Patent Publication No. 2005/0091595 A1 (“Shappell”)
Ex-1008	U.S. Patent No. 7,930,270 (“Tsang”)
Ex-1009	U.S. Patent Application No. 10/115,448 (“448 Application”)
Ex-1010	U.S. Patent No. 8,484,260 (the “’260 patent”)
Ex-1011	File History of the ’260 patent
Ex-1012	Microsoft Press. <i>Microsoft computer dictionary</i> . Microsoft Press, 2002.
Ex-1013	Steven M. Kaplan, Wiley Electrical and Electronics Engineering Dictionary, John Wiley & Sons, 2004.
Ex-1014	RFC 2616 – Hypertext Transfer Protocol – HTTP/1.1
Ex-1015	RFC 2818 – HTTP Over TLS
Ex-1016	Webpage printout – Rus Shuler, “How Does the Internet Work?” (2002)
Ex-1017	Wayback printout – “What do you need to know about how the Internet Works”
Ex-1018	Wayback printout – “File system,” Wikipedia

Ex-1019	U.S. Patent No. 9,400,884
Ex-1020	Merriam-Webster’s Collegiate Dictionary, Eleventh Edition, 2003
Ex-1021	Wayback printout – “Central processing unit,” Wikipedia
Ex-1022	U.S. Patent No. 6,351,776
Ex-1023	Good, Nathaniel S., and Aaron Krekelberg. “Usability and privacy: a study of Kazaa P2P file-sharing.” Proceedings of the SIGCHI conference on Human factors in computing systems. 2003.
Ex-1024	McCarty, William. “Learning Debian GNU/Linux.” (1999), Chapter 10 Setting Up a Linux-Based LAN, Section 10.3 Samba
Ex-1025	McCarty, William. “Learning Debian GNU/Linux.” (1999), Chapter 12 Setting Up a Linux-Based WAN, Section 12.2 Installing and Configuring a Web Server
Ex-1026	Wayback printout – “World Wide Web,” Wikipedia
Ex-1027	Wayback printout – “Hypertext Transfer Protocol,” Wikipedia
Ex-1028	Wayback printout – M.S. Schmalz, “Organization of Computer Systems: Introduction, Abstractions, Technology”
Ex-1029	Wayback printout – Chester F. Carlson, The Center for Imaging Science, Basics of File Structure
Ex-1030	Nagar, Rajeev. Windows NT file system internals: a developer’s guide. O’Reilly & Associates, Inc., 1997. (excerpted)
Ex-1031	Wayback printout – “Filesystems”
Ex-1032	Webpage printout – “Multics”
Ex-1033	Sandberg, Russel, et al. “Design and implementation of the Sun network filesystem.” Proceedings of the summer 1985 USENIX conference. 1985.

Ex-1034	[Reserved]
Ex-1035	Wayback printout – Napster
Ex-1036	Webpage printout - Peer-to-peer interactions in web brokering systems
Ex-1037	Wayback printout – Introduction to Linux Loadable Kernel Modules
Ex-1038	Webpage printout – Deploying your hardware and software systems
Ex-1039	Dolstra, Eelco, Eelco Visser, and Merijn De Jonge. “Imposing a memory management discipline on software deployment.” Proceedings. 26th International Conference on Software Engineering. IEEE, 2004.
Ex-1040	U.S. Patent Publication No. 2007/0283050 A1 (“Savage”)
Ex-1041	Foldershare Guide, available at: https://web.archive.org/web/20060313171107/https://www.foldershare.com/download/files/FolderShareGuide.pdf
Ex-1042	U.S. Patent No. 9,032,295 (“Patel”)
Ex-1043	Sotera Stipulation
Ex-1044	Wayback printout – net2ftp
Ex-1045	Wayback printout - TXFTP
Ex-1046	Wayback printout – Google Accounts

I. INTRODUCTION

Petitioner requests *Inter Partes* Review (“IPR”) of claims 1-14 (“Challenged Claims”) of U.S. Patent No. 8,296,338 (“’338 patent,” Ex-1001), purportedly owned by Entangled Media, LLC (“Patent Owner” or “PO”).

II. MANDATORY NOTICES

A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1)):

The real party-in-interest for Petitioner is Dropbox, Inc.

B. Related Matters (37 C.F.R. §42.8(b)(2)):

Entangled Media, LLC has asserted the ’338 patent and U.S. Patent No. 8,484,260 against Petitioner in *Entangled Media, LLC v. Dropbox, Inc.*, Civ. No. 5-23-cv-03264-PCP (N.D. Cal., filed Dec. 16, 2022). Petitioner will also be filing a Petition challenging claims of U.S. Patent No. 8,484,260 in IPR2024-00285.

As of the filing of this petition, no other judicial or administrative matters are known to Petitioner that would affect, or be affected by, a decision in an IPR of the ’338 patent.

Entangled Media, LLC purports to own all rights, title, and interest in the ’338 patent. *Entangled Media Complaint*, Dkt. 1, ¶10. Copies of this Petition and all supporting exhibits have been sent via Priority Mail Express to each identified party.

C. Lead Counsel (37 C.F.R. §§42.8(b)(3) & 42.10):

Petitioner designates Dion M. Bregman (Reg. No. 45,645) as lead counsel,

and designates Michael J. Lyons (Reg. No. 37,386) and Austin L. Zuck (Reg. No. 81,341) as back-up counsel.

D. Service (37 C.F.R. §42.8(b)(3)-(4)):

Service Address: Morgan, Lewis & Bockius LLP, 1400 Page Mill Road, Palo Alto, CA (Telephone: 650.843.4000; Fax: 650.843.4001).

Pursuant to 37 C.F.R. §42.8(b)(4), Petitioner consents to email service at: MLB-Dropbox-IPR-Team@morganlewis.com.

Pursuant to 37 C.F.R. §42.10(b), a Power of Attorney accompanies this Petition.

III. SUMMARY OF THE '338 PATENT

The application resulting in the '338 patent was filed on May 5, 2010, and claims the benefit of provisional application No. 61/175,489, filed on May 5, 2009 (hereinafter, the "Critical Date"). For purposes of this Petition, Petitioner assumes that the Challenged Claims are entitled to the Critical Date as the priority date but reserves the right to challenge such date in other proceedings. This patent is governed under the pre-AIA Patent Act.

A. Brief Description of the '338 Patent

The '338 patent relates to "[a] system and process that establish a singular shared file system among devices." Ex-1001, Abstract. The system "create[s] a virtual representation of data on all of the devices via metadata indexing." *Id.* For example, "each client can create the virtual representation of the remote data

within its local device file system.” *Id.*, 5:14-18. “This allows for significant amounts of data to be virtually stored on each device, even if there is no physical storage room available for the data on each device.” *Id.*, Abstract.

The ’338 patent discloses that the key to its purported invention is the creation and management of a “singular file system” with a “master index” for files on multiple user devices. *Id.*, Abstract; *see also* 6:13-16.

Figure 6 below shows “exemplary **unified file structure 20_{UFS}** [*i.e.*, the claimed master index, **yellow**] created from the individual device file structures 12_{UFS}, 14_{UFS} and 16_{UFS} [*i.e.*, the claimed individual indices, **green**] and on-line service file structure 18_{UFS}.” *Id.*, 9:13-15.¹

¹ Although Figure 6 of the ’338 patent illustrates 12_{FS}, 14_{FS} and 16_{FS}, the specification refers to them as 12_{UFS}, 14_{UFS} and 16_{UFS}, respectively.

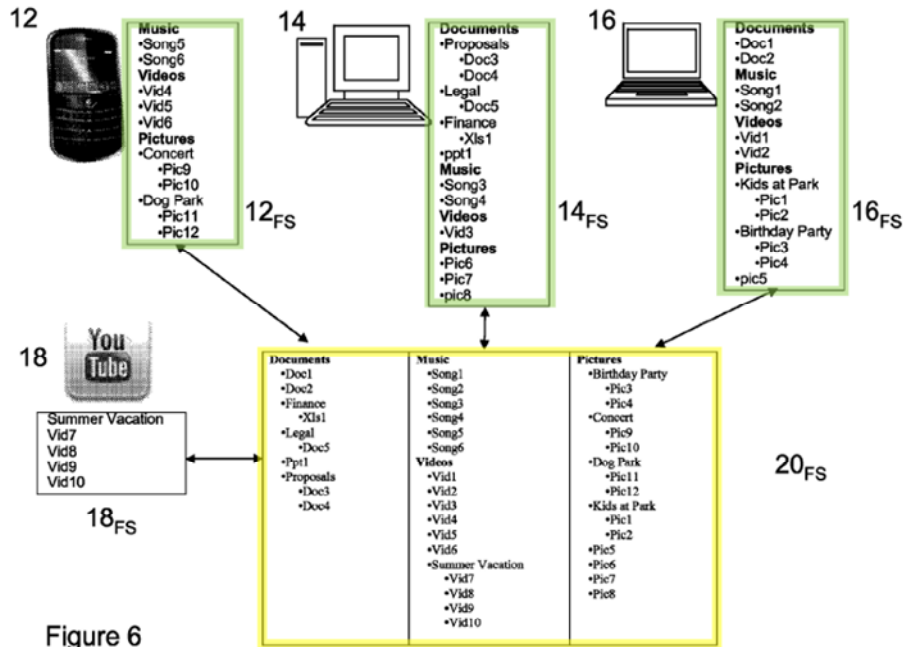


Figure 6

Ex-1001, Fig.6.²

B. Summary of the Prosecution History of the '338 Patent

In the Applicant's response to the only Office Action, the Applicant amended claim 1, arguing that the prior art:

...fail[s] to suggest the recited limitation of “providing by the at least one server the single master meta-index and meta-indices *for each of the other multiple devices to each of the multiple devices* via the individual software clients; at *each of the multiple devices, integrating metadata from the meta-indices of each of the other multiple devices into a local file system of each of the multiple devices to generate virtual files stored in the same locations as local*

² Unless indicated otherwise, all coloring and emphasis added.

files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices.” (emphasis added)
as recited in claim 1, and similarly in claims 13 and 16.

Ex-1002, p.51.

To secure allowance of claims, the Applicant later agreed to an Examiner’s amendment that narrowed claim 1 by requiring that “the **individual software clients facilitate storage** of the data within each of the multiple devices **in accordance with the single meta-data index by modifying file systems** of each of the multiple devices **to include virtual files for data** from the single meta-data index that is **not local to a multiple device.**” Ex-1002, pp.15-16.

IV. THE PRIOR ART

A. Aboulhosn

U.S. Patent No. 6,938,042 (“Aboulhosn,” Ex-1005), issued **August 30, 2005**, is prior art under §102(b).

Aboulhosn discloses “[a] method and system for sharing files between a group of computer systems.” Ex-1005, Abstract. “The files shared by a group are...represented by a folder created by the file system of each member of the group.” *Id.* Instead of storing a copy of all shared files, Aboulhosn’s virtual files “may have no actual content (e.g., a file size of 0).” *Id.*, 2:32-36.

B. Phillips

U.S. Patent No. 7,058,696 (“Phillips,” Ex-1006), issued **June 6, 2006**, is

prior art under §102(b).

Phillips discloses “[a] multi-user file storage service and system” where “[e]ach user of [a] user group is enabled to access the files of the file group” such that “the virtual storage device, and its contents (i.e., all of the files, directories/folders, etc. stored in the virtual storage device), appears, to the client node user and the application executing at the client node, to be locally present.” Ex-1006, Abstract, 6:4-7, 14:62-66.

C. Shappell

U.S. Patent Publication No. 2005/0091595 (“Shappell,” Ex-1007), published **April 28, 2005**, is prior art under §102(b).

D. Tsang

U.S. Patent No. 7,930,270 (“Tsang,” Ex-1008), filed **February 26, 2007** and issued April 19, 2011, is prior art under §102(e).

V. REQUIREMENTS FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. §42.104

A. Grounds for Standing 37 C.F.R. §42.104(a) and Fees

Petitioner certifies that the ’338 patent is available for IPR and that Petitioner is not barred or estopped from requesting this IPR.

Any additional fees for this IPR may be charged to Deposit Account No. 50-0310 (Order No. 105817-8001).

B. Identification of Challenge Under 37 C.F.R. §42.104(b) and Relief Requested

Claims 1-14 of the '338 patent are unpatentable and should be cancelled.

Ground	Statute	Reference(s)	Claims
1	§103	Aboulhosn, Phillips	1-2, 5-6, 7-9, 10-14
2	§103	Aboulhosn, Phillips, Tsang	3-4
3	§103	Aboulhosn, Phillips, Shappell	1-2, 5-6, 7-9, 10-14
4	§103	Aboulhosn, Phillips, Tsang, Shappell	3-4

VI. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

A. §325(d)

Discretionary denial under §325(d) is unwarranted.

While Aboulhosn was listed in an Information Disclosure Statement (IDS) by the Applicant during prosecution of the '338 patent (Ex-1002, p.133), the Examiner never applied Aboulhosn. Here, Aboulhosn is applied in combination with art not of record during prosecution.³ The Board should decline to exercise its discretion under §325(d) to deny institution, as the grounds and arguments presented herein are not cumulative of any considered during prosecution.

The first *Advanced Bionics* prong is not met. None of the references this

³ Aboulhosn was applied during prosecution of U.S. Patent No. 8,484,260 (“’260 patent”) after the '338 patent’s notice-of-allowance issued. Ex-1011, p.182.

Petition relies upon in combination with Aboulhosn (*i.e.*, Phillips, Shappell, and Tsang) were before the Examiner, and, as such, are not cumulative of previous art considered by the Examiner. *See Advanced Bionics*, IPR2019-01469, Paper 6 at 8; *Godbersen-Smith Constr. Co.*, IPR2021-00050, Paper 24 at 19-21 (PTAB May 7, 2021).

Nor were any similar teachings of other references discussed by the Examiner. Ex-1002, pp.60-69. As discussed in Section III.B, the '338 patent was allowed after the Examiner added into the claims, in part, **“modifying file systems of each of the multiple devices to include virtual files for data from the single meta-data index** that is not local to a multiple device.” *Id.*, pp.15-16. This, however, was well known in the art, as evidenced by Aboulhosn, Phillips, and Shappell (discussed below), none of which were raised by the Examiner.

The second *Advanced Bionics* prong is also not met. Aboulhosn was never applied during prosecution of the '338 patent, let alone in combination with Phillips and Shappell. Ex-1002, pp.60-69. The Examiner therefore failed to appreciate the clear and unambiguous teachings of Aboulhosn. *See Advanced Bionics*, IPR2019-01469, Paper 6 at 10. While Aboulhosn was cited by the Examiner during prosecution of the related '260 patent, this occurred after the '338 patent claims were allowed. *See* Ex-1002, p.10; Ex-1011, p.177. Moreover, in response to the '260 patent's non-final Office Action dated October 25, 2012, the

Applicant distinguished Aboulhosn from a limitation requiring that “virtual files appear **indistinguishable** to the singular file system.” Ex-1010, claim 1. The Applicant distinguished Aboulhosn due to its disclosure of including “.vf” in the file name of virtual files. Ex-1011, pp.54-55. The ’338 patent claims include a similar “indistinguishability” limitation, and this Petition **does not rely on Aboulhosn for this limitation**. Instead, this Petition relies on Phillips (which was not before the Office during prosecution of either the ’260 or the ’338 patents). The Aboulhosn-Phillips system does not include “.vf” or any other distinguishing characteristic in the file name.

Accordingly, the Board should not deny institution under §325(d).

B. §314(a)

Discretionary denial is also inappropriate under §314(a). Following the guidance that “the PTAB will not discretionarily deny institution in view of parallel district court litigation” if a Sotera stipulation is filed (Director Vidal’s June 21, 2022 Memorandum), Petitioner herewith provides such a Sotera stipulation (Ex-1043).

VII. LEVEL OF ORDINARY SKILL

A person having ordinary skill in the art (“PHOSITA”) at the time of the alleged invention of the ’338 patent would have been a person holding at least a master’s degree in computer science or electrical engineering or a related degree

and with at least two years training or experience with networking and file systems. Ex-1003, ¶¶19-21.

VIII. CLAIM CONSTRUCTION

A. Terms to Be Construed

Petitioner proposes the following term for construction:

1. “web-based system”

Independent claim 1 requires a “web-based system.” The term “web-based” is not explicitly defined in the specification, but a PHOSITA would have understood that the “web” refers to World Wide Web, which is “a system of interlinked hypertext documents accessed via the **Internet**.” Ex-1026, p.1. In other words, a “web-based system” is a system that operates on the **Internet** to provide a service. It uses Internet protocols such as FTP or HTTP and is commonly accessed by a user via a web-browser. This construction is consistent with the ’338 patent specification: “Web Service—is a part of the system that operates on the **Internet**...” Ex-1001, 4:43-44; Ex-1003, ¶65.

To the extent PO argues that “web-based” requires using a web protocol, such as http, and/or using a web browser (*see* Ex-1001, 7:6-11), Petitioner disagrees with such a narrow construction, but nevertheless shows below that this

too is taught by the prior art. Ex-1003, ¶66.⁴

For this Petition, Petitioner believes that all remaining claims should be given their plain and ordinary meanings, and no express constructions are required. Ex-1003, ¶68.

IX. GROUND 1: CLAIMS 1-2 AND 5-14 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS

A. Claim 1⁵

1. 1[P]: “A process for establishing a singular file system across multiple devices”

To the extent that 1[P] is limiting,⁶ Aboulhosen discloses it. Ex-1003, ¶¶84-88.

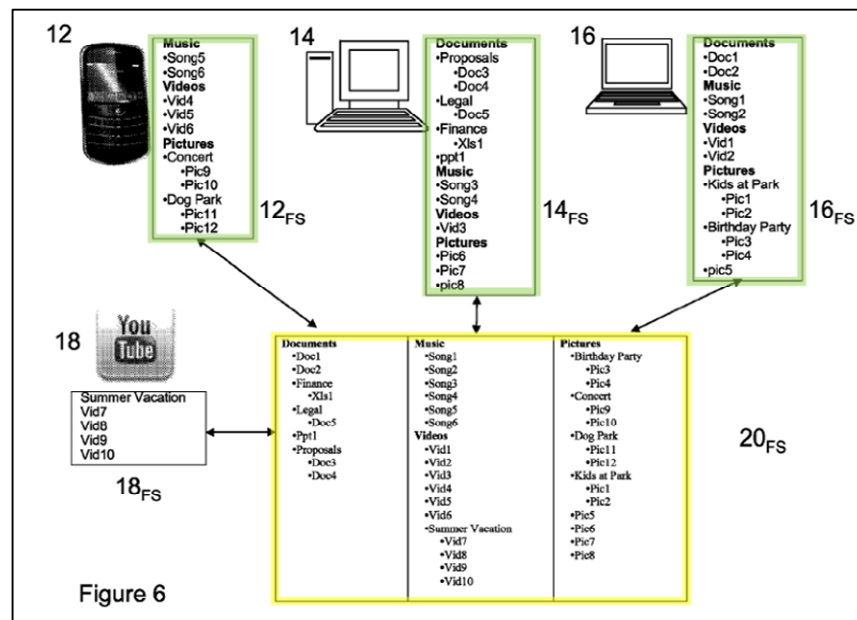
The '338 patent describes “a singular file system” as a system used to manage and display files across multiple devices. *See, e.g.*, Ex-1001, 3:17-19, 5:63-64, 6:13-16. As shown in Figure 6 below, the '338 patent illustrates its

⁴ As demonstrated below, Aboulhosen discloses a system that communicates via the Internet. To the extent a narrower construction is adopted, Phillips discloses it. *See* Section IX.A.2; Ex-1003, ¶67.

⁵ A claim listing is provided in Appendix A.

⁶ Petitioner does not believe the preamble is limiting because it does not recite any essential step, nor is it necessary to give life, meaning, and vitality to claim 1. The preamble recites language that is introduced in 1[A].

singular file system using an “exemplary **unified file structure 20_{UFS}** [yellow] created from the individual device file structures 12_{UFS}, 14_{UFS} and 16_{UFS} [green] and on-line service file structure 18_{UFS}” and “[t]his unified file structure 20_{UFS} [yellow] will replace file structures 12_{UFS}, 14_{UFS} and 16_{UFS} in devices 12, 14 and 16.” *Id.*, 9:13-18.

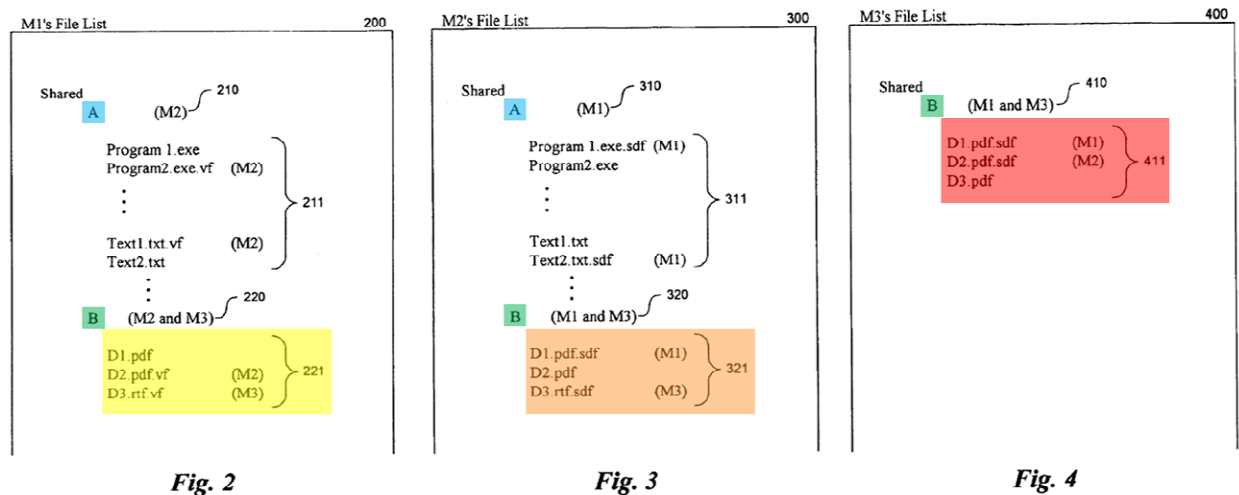


Ex-1001, Fig.6; Ex-1003, ¶85.

Aboulhosn discloses the exact same. For example, Aboulhosn discloses “[a] method and system for **sharing files between a group of computer systems**” where “[t]he files shared by a group are associated with a group folder.” Ex-1005, 2:1-2. Aboulhosn’s “group folder is represented by a folder created by the file system of each member [of the group]” and “[t]he folder at each member contains a file for each file that is shared by the group.” *Id.*, 2:2-5. In other words,

Aboulhosn discloses establishing a file system (including the shared/group folder) common to multiple computer systems. Ex-1003, ¶86.

Also, Aboulhosn's Figures 2-4 illustrate a unified file structure shared between three computer systems M1, M2, and M3, each with the same shared folder. Ex-1005, 4:15-16.



“M1 and M2 are members of a group ‘A’ [blue] and M1, M2, and M3 are members of group ‘B’ [green].” *Id.*, 4:16-17. Each of M1, M2, and M3 share a unified file structure—*i.e.*, 221 for M1 (yellow), 321 for M2 (orange), and 411 for M3 (red). Like the claimed “singular file system,” Aboulhosn’s unified file structure also includes shared files from individual devices—*i.e.*, “D1.pdf” from M1, “D2.pdf” from M2, and “D3.pdf” from M3. Ex-1003, ¶87.

Therefore, Aboulhosn discloses “[a] process [described in subsequent steps] for establishing a singular file system [*e.g.*, Aboulhosn’s file system including shared/group folder(s)] across multiple devices [*e.g.*, group members, such as M1,

M2, and M2].” Ex-1003, ¶¶84-88.

2. 1[A]: “receiving user information to open an account for establishing a singular file system across multiple devices via a web-based system that includes at least one server”

Receiving user information. Aboulhosn discloses “a group owner [“GO”] component that **creates a group**...[and] invites computer systems to join the group as members....” Ex-1005, claim 39. In creating the group of authorized members to establish Aboulhosn’s singular file system, user information is received by Aboulhosn’s system. Ex-1003, ¶90.

For example, Aboulhosn’s “group owner [*i.e.*, GO computer] initially receives an indication from its user [*i.e.*, GO person] that **a registered computer system is to be invited** to join the group.” *Id.*, 6:8-10. “The group owner [*i.e.*, GO computer] then sends an invitation request message 611 [yellow] to the invited computer system.” *Id.*, 6:13-15.

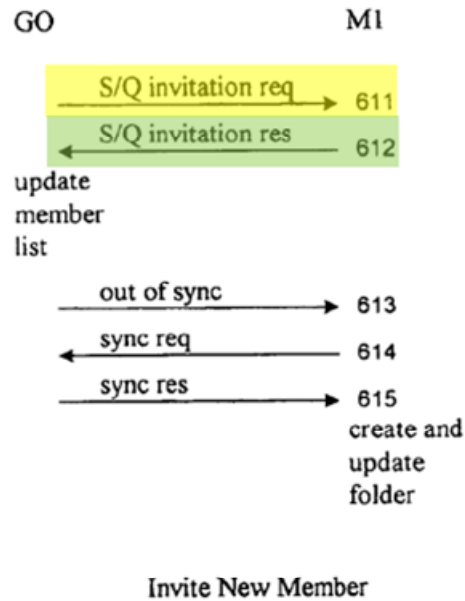


Fig. 6A

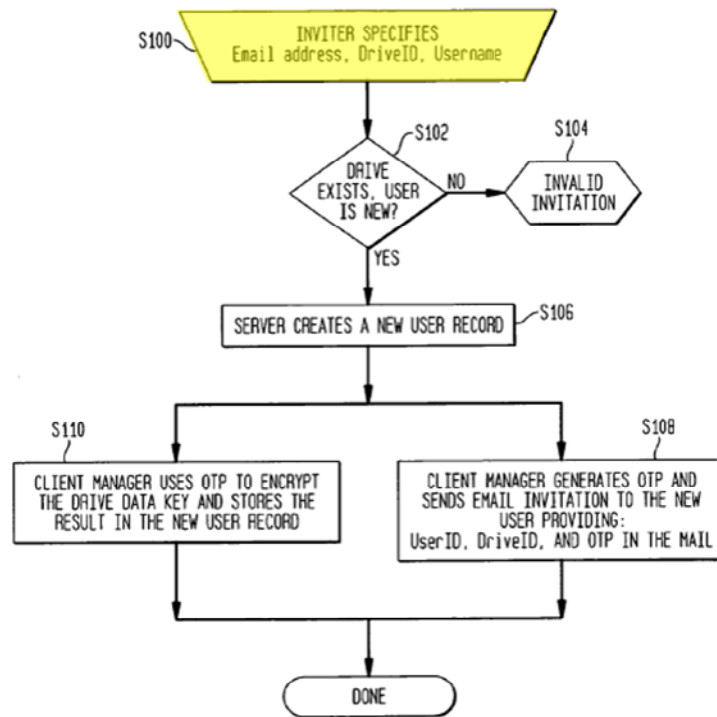
Ex-1005, Fig.6A. The invited computer system accepts the invitation by “send[ing] **an invitation response message 612** [green] to the group owner [*i.e.*, GO computer]...[who] updates its member list for that group accordingly.” *Id.*, 6:43-46. In other words, to create an account (*e.g.*, an established group of authorized users), Aboulhosn’s GO receives user information, such as an identification of the to-be-invited device and a response message accepting an invitation. Ex-1003, ¶91.

Aboulhosn also discloses that “[a] member comes online by providing **authentication information** to the authentication server.” Ex-1005, 7:33-35. The ’448 Application—from which Aboulhosn claims priority, and “incorporate[s] by reference in its entirety” (Ex-1005, 1:6-9)—explains that authentication

information includes “**a user name and password.**” Ex-1009, p.6, 4:6; p.9, 7:12-16; p.12, 10:4-6. Thus, a PHOSITA would have understood that when creating an account (*i.e.*, an established group of authorized users), Aboulhosn’s authentication server receives **authentication information, such as usernames and passwords** (just like in the ’338 patent), to store in its “registered table” for later authentication. Ex-1005, 5:33-38; Ex-1001, 5:39-42 (“Registration information includes **user name**...as well as creation of **user name and password.**”); Ex-1003, ¶¶92-93.

To the extent PO argues that Aboulhosn does not disclose “receiving user information,” Phillips discloses it. In particular, Phillips discloses “[a]ccepting requests from client manager nodes to **create client user accounts.**” Ex-1006, 12:49-50. Phillips’s “client manager node is able to designate new user accounts” by “issu[ing] a message containing a command to invite a new user, **the email address of the new user, a user name for the new user and an identifier of the virtual storage device (‘drive id’) of the virtual storage device** on which the new user is to be invited.” Ex-1006, 12:36-37, 16:23-28; *see id.*, Fig.5 (step S100, yellow).

FIG. 5



Ex-1006, Fig.5. A PHOSITA would have understood that in issuing invitations, Phillips’s client manager node necessarily receives (*e.g.*, from the user) user information, such as email addresses, usernames, and an identification of user devices. *See* Ex-1001, 5:40-41 (“Registration information includes **user name**, **e-mail address**....”); Ex-1003, ¶94.

Web-based system. As discussed in Section VIII.A.1, a “web-based system” is a system that operates on the **Internet** to provide a service using Internet protocols, such as FTP or HTTP, and is commonly accessed by a user via a web-browser. Aboulhoshn discloses this limitation because Aboulhoshn’s “computer systems 510 communicate with each other and with authentication server 520 via

communications link 530,” which includes “the **Internet**, a local area network, a **wide area network.**” Ex-1005, 4:67-5:2, 5:58-60. Therefore, Aboulhosn’s system is a system that operates on the Internet to provide services, such as file synchronization and account registration. Ex-1003, ¶95.

Aboulhosn also discloses use of an Internet protocol, such as FTP. *Id.*, 1:24-25. Since FTP was one of the most common protocols at the time used in web-based systems, it would have been obvious to a PHOSITA to use a web-based Internet communications link in Aboulhosn. Moreover, at the time. It was common to register and account by visiting a website through a web browser. Therefore, a PHOSITA would have found it obvious to implement Aboulhosn’s account registration via a web-based system to address Aboulhosn’s “unfamiliar user interface problem.” Ex-1005, 1:25-30; Ex-1003, ¶96.

To the extent that Patent Owner argues that Aboulhosn does not disclose a “web-based system” requiring using a web protocol (such as http) or a web browser, Phillips discloses it. *See* Ex-1006, 8:9-14 (“Communication is achieved in the **Internet** using...**the hypertext transfer protocol (http) and the hypertext transfer protocol over secured sockets layer (https).**”); Ex-1006, 2:41-44 (“user can access [a remote storage device] while executing a **web browser program** on the user’s computer terminal....”); Ex-1003, ¶¶97-98.

As detailed in Section IX.B, a PHOSITA would have been motivated to

incorporate Phillips's http/https protocol and web browser into Aboulhosn's system. Therefore, the Aboulhosn-Phillips system is a web-based system. Ex-1003, ¶99.

At least one server. A PHOSITA would have recognized that a server is “a computer in a network that is used to provide services (as access to files or shared peripherals or the routing of e-mail) to other computers in the network,” *e.g.*, clients. Ex-1020, pp.3-4. This is what Aboulhosn's GO computer does—GO “ha[s] the sole authority to invite other computer systems to join the group,” “maintains a list of the group members,” and routes “messages related to metadata updates.” Ex-1005, 1:63-65, 2:42-43, 2:43-44. “When a member goes online, it contacts the group owner (assuming that the group owner is currently online) to synchronize its copy of the group folder with the group owner.” *Id.*, 2:64-67. Thus, Aboulhosn's GO provides device registration, group member maintenance, metadata routing, and file synchronization services to member devices, *e.g.*, clients, and is therefore a “server.”⁷ Ex-1003, ¶100.

⁷ This limitation recites “receiving user information...via a web-based system that includes at least one server,” which does not require that the “at least one server” (*i.e.*, Aboulhosn's GO computer) receive user information. Aboulhosn teaches that “[t]he functions of the authentication server may be divided among multiple

Therefore, Aboulhosn in view of Phillips discloses **“receiving user information to open an account for establishing a singular file system [e.g., Aboulhosn’s GO creating the group from information received from the GO user and also receiving information from individual member users, including usernames and passwords to establish a group of authorized users, or Phillips’s creating accounts using received username and email address] across multiple devices [e.g., Aboulhosn’s member devices] via a web-based system [e.g., Aboulhosn’s system, or Aboulhosn’s system using Phillips’s http/https for network communications and/or web browser] that includes at least one server [e.g., Aboulhosn’s GO computer acting as a server].”** Ex-1003, ¶¶89-102.

3. 1[B]: “installing an individual software client on each of the multiple devices via the web-based system”

The ’338 patent states that a “Software Client (or the Client)—is a piece of software that is installed and runs continuously on the device.” Ex-1001, 4:41-42; *see id.*, 5:43-46.

Aboulhosn discloses the same. Aboulhosn’s “computer system[] 510
servers.” Ex-1005, 5:46-49. Thus, a PHOSITA would have understood that Aboulhosn’s GO computer can be a separate and distinct server or can be combined with at least some functions of the authentication server, including receiving user information. Ex-1003, ¶101.

include[s] a **peer component 511** [blue]...which may be **downloaded** from the authentication server [green] when the computer system is registered, [and] controls the sharing of files with other computer systems.” Ex-1005, 4:66-5:9.

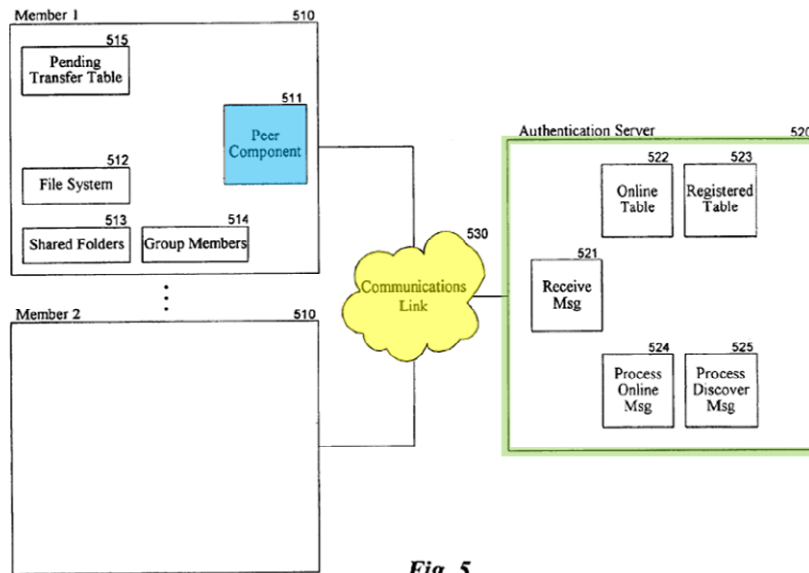


Fig. 5

Ex-1005, Fig.5. Aboulhosn explains that “the functions of **the peer component**...include registering a computer system, placing a computer system online, creating groups, inviting computer systems to become members of a group, sending updates to metadata, and so on.” *Id.*, 5:9-14; *see also id.*, 7:65-8:67, Figs. 7-10. Thus, Aboulhosn’s peer component 511 is a software client downloaded from the authentication server 520 and installed on each of Aboulhosn’s member devices. Ex-1003, ¶105.

Aboulhosn also discloses that its software client (*i.e.*, peer component) is installed “via the web-based system.” Aboulhosn’s peer component is “**downloaded** from the authentication server” via communications link 530

(yellow). Ex-1005, 5:6-8. Aboulhoshn's Figure 5 below clearly shows that the peer component 511 (blue) is installed on member devices. A PHOSITA would also have understood that for Aboulhoshn's peer component to operate and perform various functions as described, it is necessarily installed on member devices. As explained above, Aboulhoshn's communications link is Internet-based and part of a web-based system, and, therefore, its peer component is installed via the web-based system. *See* Section IX.A.2.

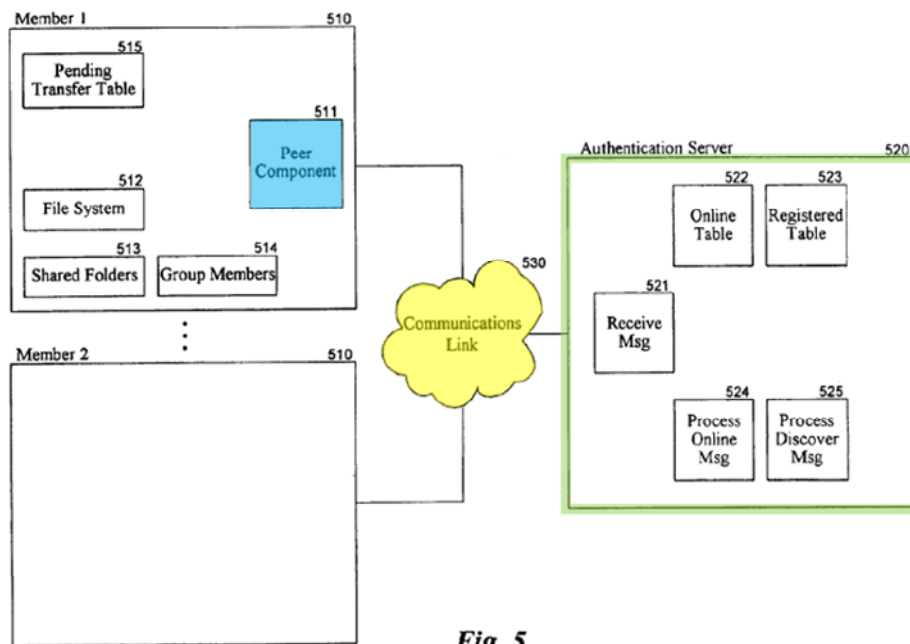
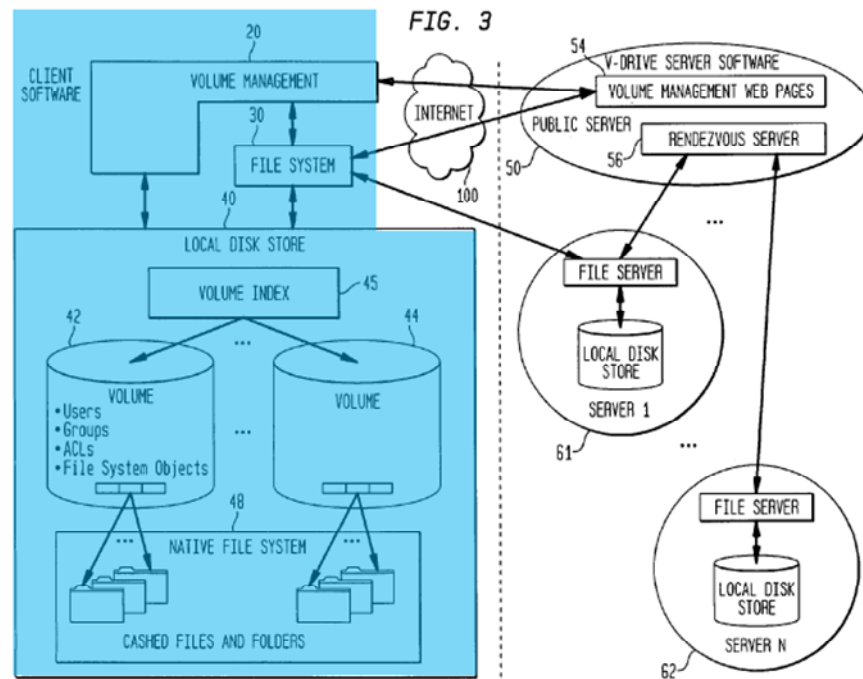


Fig. 5

Ex-1005, Fig.5; Ex-1003, ¶106.

To the extent PO argues that Aboulhoshn does not disclose installing an individual software client via a web-based system, Phillips discloses it. Phillips discloses in Figure 3 a client software architecture (blue) “can be **deployed** on moveable computer terminals (such as laptops) and or computer terminals” (Ex-

1006, 11:19-24), which a PHOSITA would have understood means “installing” a software client. As described above, Phillips also describes its system is web-based. Ex-1003, ¶¶107-108.



Ex-1006, Fig.3.

Therefore, Aboulhosen in view of Phillips discloses “**installing an individual software client** [e.g., installing Aboulhosen’s downloaded peer component or Phillips’s client software architecture] **on each of the multiple devices** [e.g., Aboulhosen’s member devices M1, M2, and M3] **via the web-based system** [e.g., Aboulhosen’s system, or Aboulhosen’s system using Phillips’s http/https for network communications and/or web browser].” Ex-1003, ¶¶103-109.

4. 1[C]: “accepting registration of multiple devices via the web-based system”

Aboulhosn discloses this limitation. Aboulhosn discloses “the computer system [] **register[ing] with the authentication server.**” Ex-1005, 3:15-18. As shown below, Aboulhosn’s “authentication server [green] includes...a registered table 523 [purple]...[that] contains an entry for each computer system that is currently **registered with the file sharing system.**” Ex-1005, 5:27-35; 5:46-49 (“[T]he authentication server...**handl[es] registration requests....**”).

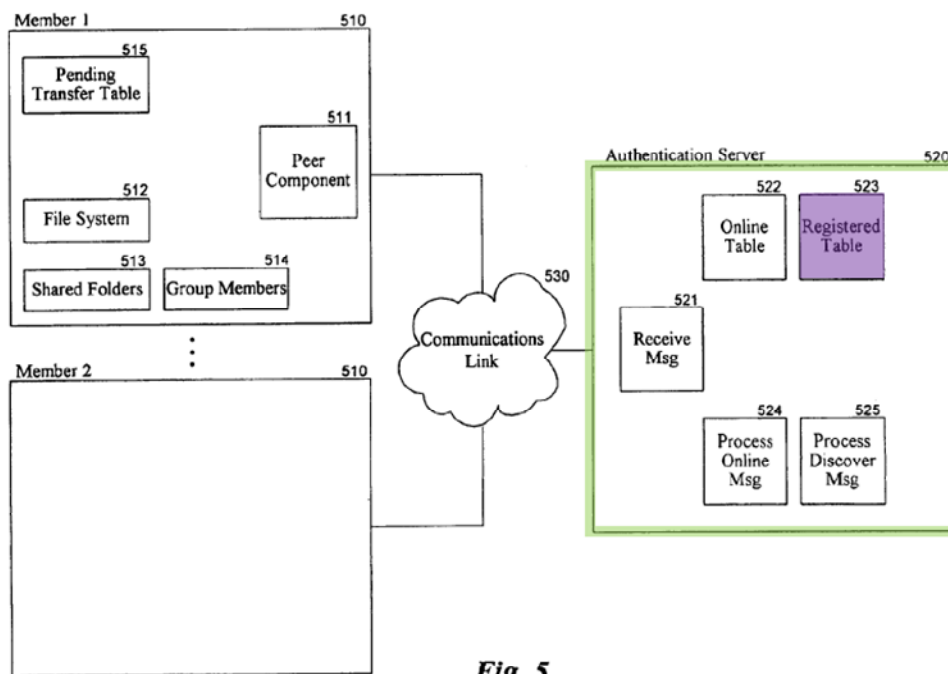


Fig. 5

Ex-1005, Fig.5; Ex-1003, ¶¶110-111.

Aboulhosn describes in Figure 6A the process “when a group owner invites a computer system to become a new member.” Ex-1005, 6:6-7.

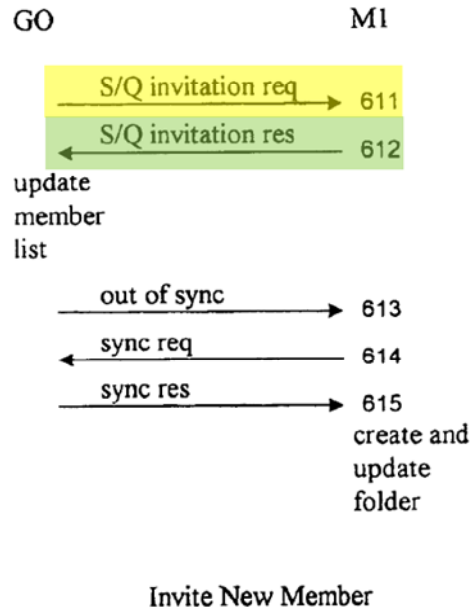


Fig. 6A

Ex-1005, Fig.6A. “[G]roup owner [] sends an invitation request message 611 [yellow] to the invited computer system [M1],” which then “sends an invitation response message 612 [green] to the group owner.” 6:13-15, 6:42-44. Once “the group owner **receives the invitation response message, it updates its member list for that group** accordingly.” *Id.*, 6:41-46. Therefore, by registering a computer system to add it to its member list, Aboulhosn’s GO computer/server accepts registration of member devices via the web-based system. *See* Section IX.A.2; Ex-1003, ¶112.

Therefore, Aboulhosn in view of Phillips discloses “**accepting registration of multiple devices** [e.g., Aboulhosn’s authentication server receiving an invitation response message from each member device and creating an entry for a

computer system in the registered table, and/or Aboulhosn's GO computer/server updating its member list to register a new member] **via the web-based system** [e.g., Aboulhosn's Internet, or Aboulhosn-Phillips's http/https and/or web browser]." Ex-1003, ¶¶110-113.

5. **1[D]: "scanning each of the multiple devices by each of the individual software clients to inventory data on each of the multiple devices and create a meta-index of the files for the inventoried data"**

Aboulhosn discloses this limitation, e.g., when **each member device adds or modifies files in the group folder**. Aboulhosn's Figure 6B illustrates "message flows when a member of the group updates the group folder...[including] **by adding, deleting, or modifying** a file of the shared folder." Ex-1005, 6:59-62. When M1 updates the group folder, it sends "a synchronization response message 623 [green] that contains the **metadata describing the update**." *Id.*, 6:66-7:1.

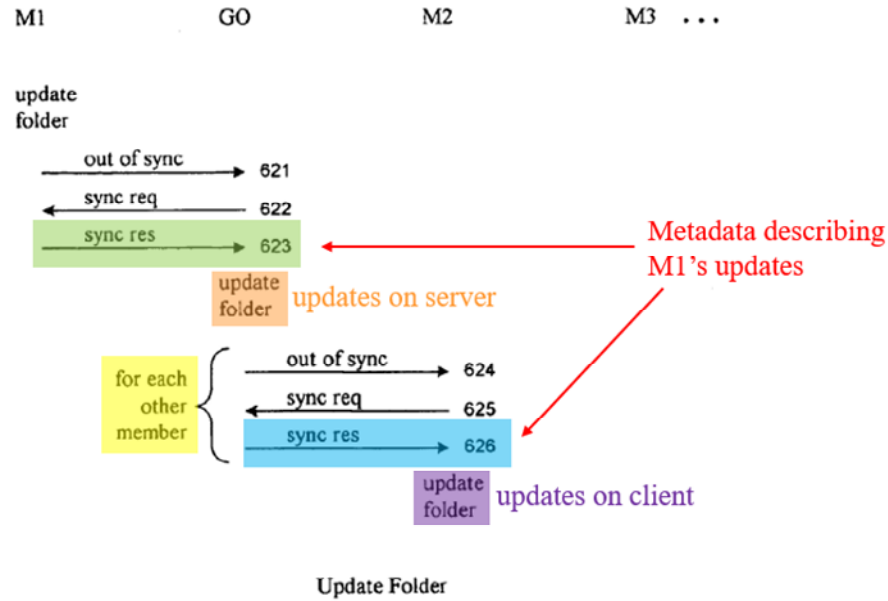


Fig. 6B

Ex-1005, Fig.6B. Thus, when M1 adds or modifies files in the group folder, it creates a meta-index, *e.g.*, metadata describing the newly added or modified one or more files. To create such a meta-index, a PHOSITA would have understood that M1 necessarily scans (*e.g.*, analyzes) its local version of the shared folder to inventory the added or modified one or more files, or would have found it obvious for M1 to do so. Ex-1003, ¶¶114-116.

Accordingly, when each of the multiple devices adds or modifies one or more files, each of them scans the respective device to inventory the added or modified file(s) and creates a respective meta-index describing the updates. Ex-1003, ¶117.

Aboulhosn also discloses this limitation when, *e.g.*, the **GO**

computer/server comes online after being offline. Aboulhosn illustrates in

Figure 6E “message flows when a group owner comes online.” Ex-1005, 7:50-51.

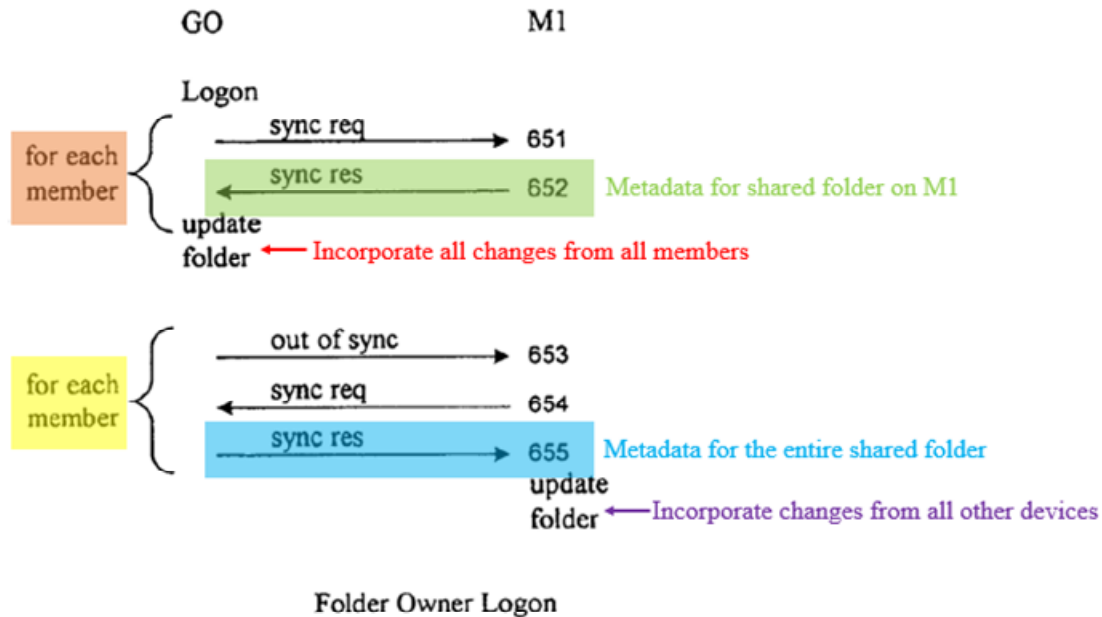


Fig. 6E

Ex-1005, Fig.6E. As shown, “[w]hen a group owner becomes online, it sends a synchronization request message 651 to each member [orange]...[who] responds with a synchronization response message 652 [green] containing the **metadata for that shared folder.**” *Id.*, 7:51-57. Thus, when (1) GO is offline, (2) each of M1, M2, and M3 adds one or more files to the shared folder for the first time, and (3) then GO becomes online, a PHOSITA would have understood that each of M1, M2, and M3 necessarily scans (*e.g.*, analyzes) its local device for the newly added files to create a respective meta-index for the newly added one or more files (*i.e.*, “metadata for [the] shared folder”), or would have found it obvious for M1, M2,

and M3 to do so. Ex-1003, ¶118.

A PHOSITA would have further understood that Aboulhosen's scanning of file additions/modifications is performed by at least the peer component 511 (blue) on each member device, which “updates the metadata for each file in the group, create[es] new files as necessary” and “controls the sharing of files with other computer systems...including...sending updates to metadata, and so on.” Ex-1005, 8:51-52, 5:6-14.

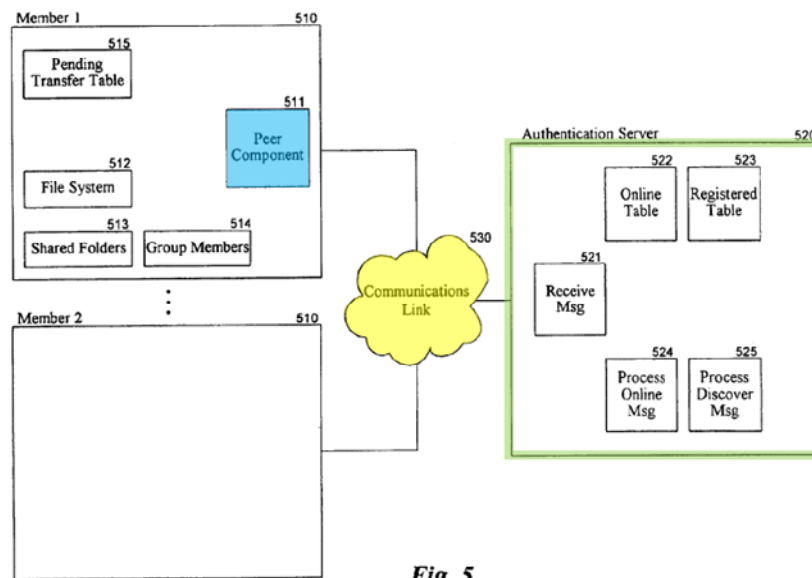


Fig. 5

Ex-1005, Fig.5; Ex-1003, ¶119.

Therefore, Aboulhosen discloses “**scanning each of the multiple devices** [e.g., scanning each of the member devices M1, M2, and M3] **by each of the individual software clients** [e.g., at least the peer component on each member device] **to inventory data on each of the multiple devices** [e.g., inventory newly added/modified files on each member device (when member devices add/update

files), or files added by each member device for the first time (when GO comes online after being offline)] **and create a meta-index of the files for the inventoried data** [*e.g.*, metadata describing additions of or modifications to one or more files on each device (when all member devices add/update files), or metadata for one or more files added by each member device for the first time (when the comes online after being offline)].” Ex-1003, ¶¶114-120.

6. 1[E]: “providing by the individual software clients via the multiple devices individual meta-indices of the inventoried data for each of the multiple devices to the at least one server”

Aboulhosn discloses that each of the member devices sends respective individual meta-indices of its respective inventoried data to Aboulhosn’s GO (the claimed “at least one server,” *see* Section IX.B.2) when (1) each of the member devices updates its respective group folder, and (2) the GO comes online after being offline. *See* Section IX.A.5 (1[D]); Ex-1003, ¶122.

Aboulhosn also discloses transmitting meta-indices by the peer component 511 (blue) on each member device. *See* Ex-1005, 5:6-14 (“The peer component...controls the sharing of files with other computer systems...[and] **sending updates to metadata**, and so on”).

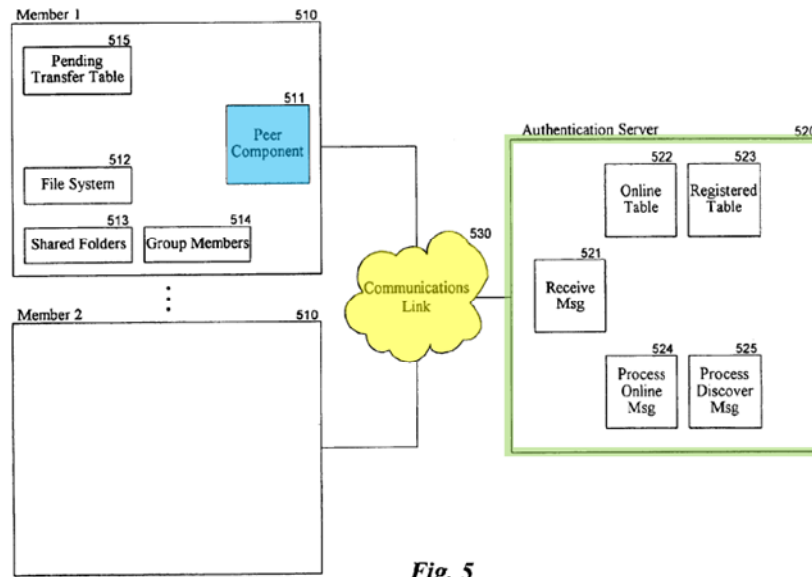


Fig. 5

Ex-1005, Fig.5; Ex-1003, ¶123.

Therefore, Aboulhoshn discloses “**providing by the individual software clients** [e.g., peer component 511 on each member device] **via the multiple devices** [e.g., member devices M1, M2, and M3] **individual meta-indices of the inventoried data for each of the multiple devices** [e.g., metadata describing file additions/modifications (when all member devices add/update files), or metadata for files added by each member device for the first time (when the GO comes online after being offline)] **to the at least one server** [e.g., Aboulhoshn’s GO computer/server].” Ex-1003, ¶¶121-124.

7. 1[F]: “integrating by the at least one server the individual meta-indices to create a single master meta-index”

The ’338 patent’s “master index of metadata” refers to metadata stored in a “database.” Ex-1001, 6:4-16 (“[T]he web service integrates all of the individual

meta-indices for all of the user's registered devices **into a database...**[which is the] **master index of metadata...**"). In other words, a single master meta-index in the '338 patent is an aggregation of individual meta-indices from member devices. Ex-1003, ¶126.

Aboulhosn's "metadata associated with the [entire] shared folder" (Ex-1005, 7:2-3) is a single master meta-index because the shared folder includes files from multiple member devices, and the metadata associated with the **shared folder** is an integration or aggregation of the metadata associated with the files from all member devices. Ex-1003, ¶127.

Aboulhosn discloses the claimed integration and creation of a single master meta-index in at least two exemplary scenarios—(1) when each member device adds/modifies files in the shared folder, and (2) when the GO comes online after being offline. Ex-1003, ¶128.

First, when each of Aboulhosn's member devices adds/modifies files in the shared folder, the GO receives "metadata describing the updates" via a synchronization response message 623 (**green**) from M1. The GO then "updates [] the **metadata associated with the shared folder [i.e., the singular file system] [orange]**." Ex-1005, 7:2-3.

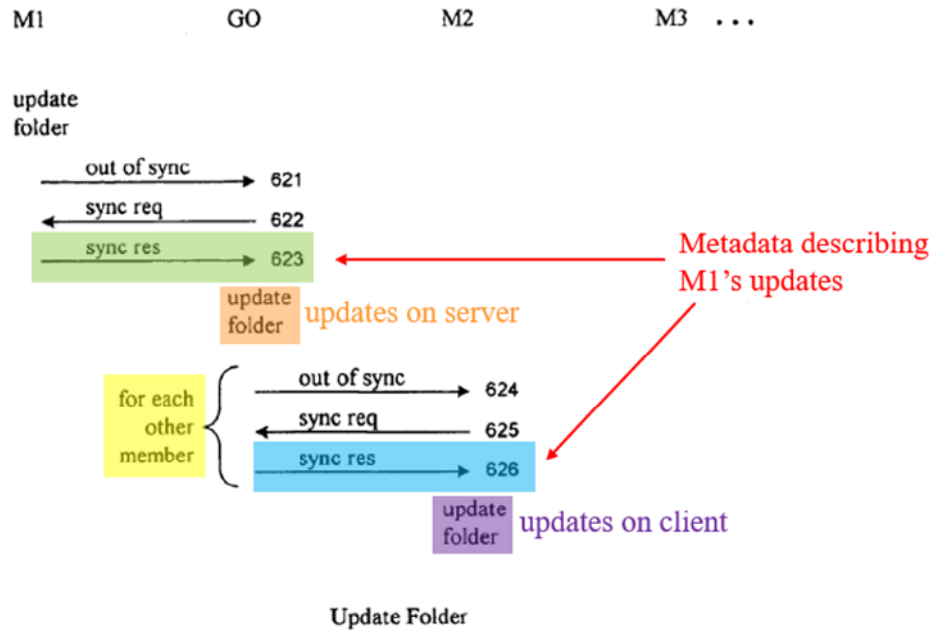


Fig. 6B

Ex-1005, Fig.6B. When each member device adds new files to the shared folder **for the first time**, the GO receives individual meta-indices (*e.g.*, synchronization response message 623) from each member device and **creates** a single master meta-index (*e.g.*, metadata associated with the shared folder) by combining or integrating individual meta-indices into the shared folder structure. Ex-1003, ¶129.

Second, when the GO comes online after being offline, “[e]ach member...[sends] a synchronization response message 652 [green] containing the metadata for that shared folder. The group owner then **updates its shared folder [red]** to correspond to all the updates by any of the members that occurred while the group owner was offline.” Ex-1005, 7:51-57. This process includes integrating the metadata received from each member device into the GO’s own

metadata table for the entire shared folder, *i.e.*, the single master meta-index.

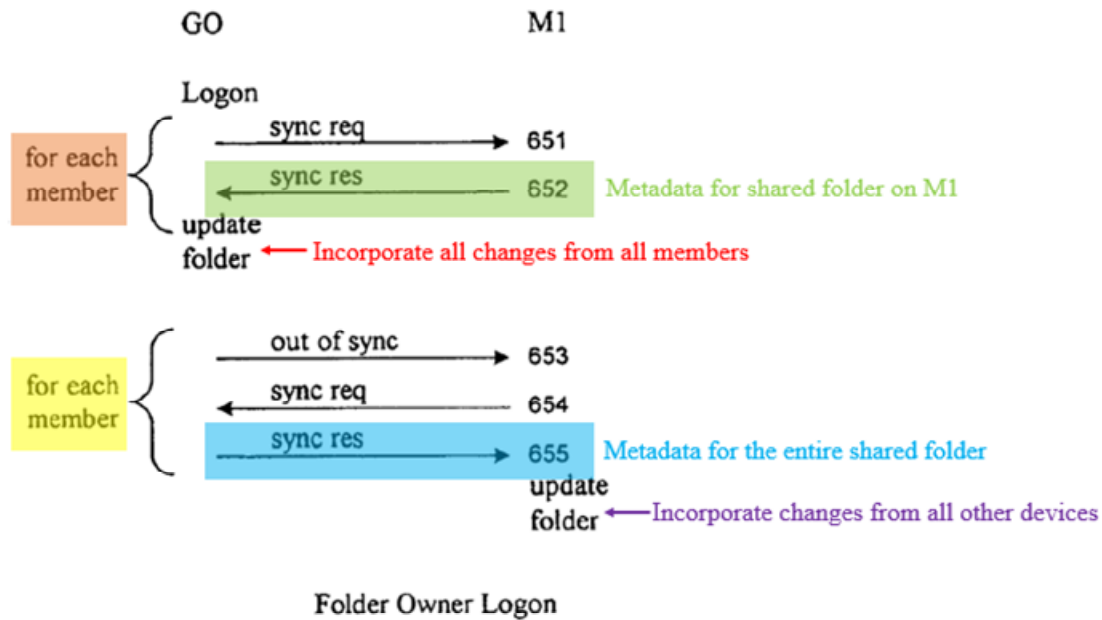


Fig. 6E

Ex-1005, Fig.6E. This occurs at least where (i) the shared folder is empty when the GO goes offline, (ii) each member device adds new files to the shared folder, and (iii) the GO then comes online. In this situation, the GO receives individual meta-indices from each member device and updates its shared folder to “create,” for the first time, a single master meta-index for the shared folder. Ex-1003, ¶130.

Therefore, Aboulhosn discloses “**integrating by the at least one server** [e.g., Aboulhosn’s GO as a server] **the individual meta-indices** [e.g., metadata describing file additions/modifications (when all member devices add/update files), or metadata for files added by each member device for the first time (when the comes online after being offline)] **to create a single master meta-index** [e.g.,

metadata associated with the entire shared folder].” Ex-1003, ¶¶125-131.

8. **1[G]: “providing by the at least one server [i] the single master meta-index and [ii] meta-indices for each of the other multiple devices to each of the multiple devices via the individual software clients”**

1[G] requires sending both (1) the single master meta-index, and (2) the “meta-indices for each of the other multiple devices” to each of the multiple devices. Aboulhosn discloses sending both. Ex-1003, ¶132.

First, Aboulhosn discloses “providing by the at least one server...[ii] **meta-indices for each of the other multiple devices** to each of the multiple devices.”

When M1 adds/modifies files in the shared folder, M1 sends “**the metadata describing the update**” (synchronization response message 623, **green**) to the GO, which “**sends the metadata [describing the update] to the members (yellow)** via a synchronization response message 626 [**blue**].” Ex-1005, 6:64-7:3, 7:4-11.

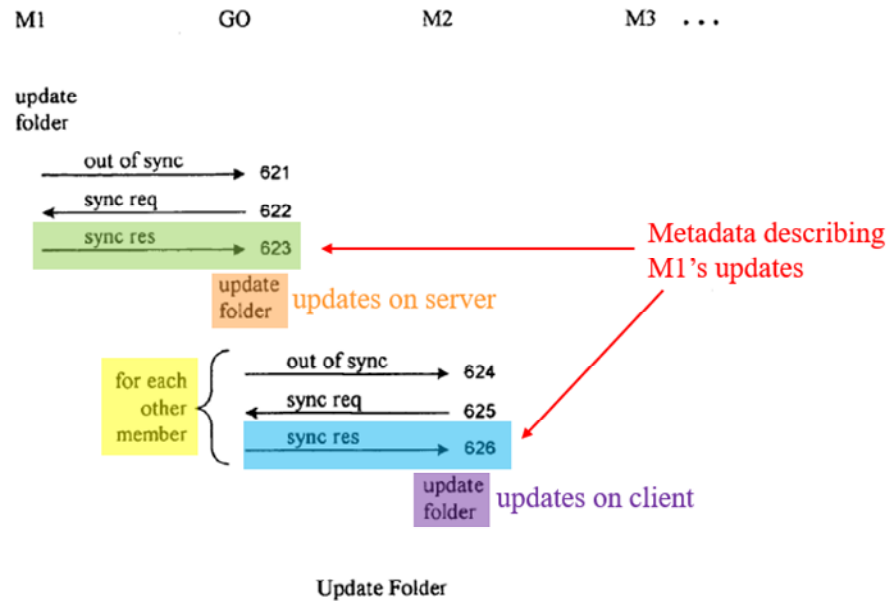


Fig. 6B

Ex-1005, Fig.6B; Ex-1003, ¶133.

A PHOSITA would have understood that “**the** metadata” sent by the GO via the synchronization response message 626 (blue) is **the** metadata describing the update, and is not metadata for the entire shared folder. Aboulhosn discloses several embodiments where synchronization response messages are sent by the GO. When the message includes the metadata for the entire shared folder, Aboulhosn explicitly discloses this. *See, e.g.*, Ex-1005, 6:53-56 (when inviting a new member, “the group owner collects the **metadata for the shared files of the group** and **sends that metadata** to the new member”); 7:61-63 (when the group owner comes online after being offline, “[t]he group owner then sends **the current metadata for the shared folder**”). In contrast, Aboulhosn describes that message

626 (blue) (Figure 6B above) contains “the metadata” (as opposed to “the metadata for the shared folder”), and a PHOSITA would have understood it to refer to metadata that the GO receives from individual member devices, *i.e.*, the metadata describing the update.⁸ Ex-1003, ¶134.

Moreover, a PHOSITA would have understood that, in the process depicted in Figure 6B, the GO provides the metadata from M1 to the other member devices and that the GO sends out what it receives. A PHOSITA would have appreciated that the GO needs not send the metadata for the entire shared folder to all other member devices when the only change to the shared folder concerns the metadata describing updates. Sending the metadata for the entire folder would be highly inefficient and run counter to good network design practices. Ex-1003, ¶136.

Accordingly, when each member device adds/modifies files in the shared folder, the metadata describing the updates from each member device is provided

⁸ To the extent PO argues that Aboulhosn discloses with respect to Figure 10 that a “synchronization response message contains metadata for each file currently in the group” (Ex-1005, 8:49-51), this merely relates to “one embodiment” (*id.*, 8:49). Aboulhosn’s synchronization response message does not always contain metadata for the entire shared folder. *See, e.g., id.*, 6:66-7:1 (“a synchronization response message 623 that contains the metadata describing the update”). Ex-1003, ¶135.

by the GO (*i.e.*, the claimed at least one server) to each of the other member devices. *See also* Ex-1005, 2:43-44 (“All messages related to metadata updates are **routed** through the group owner.”); Ex-1003, ¶137.

Second, Aboulhosn discloses “providing by the at least one server [i] the **single master meta-index**...to each of the multiple devices.” Aboulhosn discloses that when the GO comes online from being offline, it receives “**metadata for that shared folder**” (green) from each member device (orange) and “sends the **current metadata for the shared folder** in a synchronization response message 655 [blue] to each member [yellow].” Ex-1005, 7:54-55; 7:61-63.

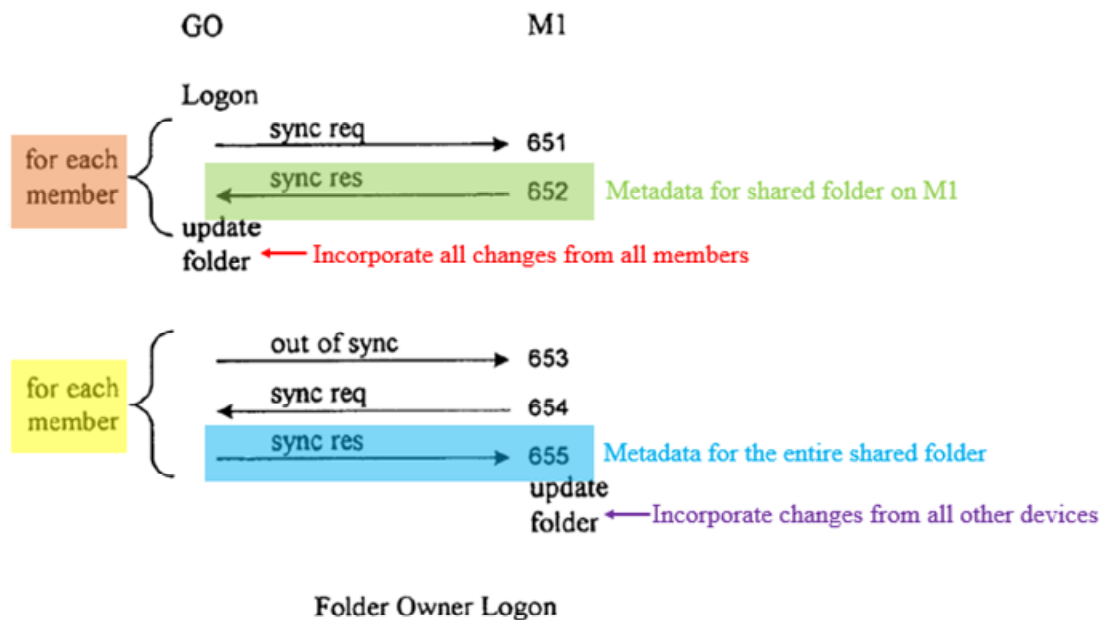


Fig. 6E

Ex-1005, Fig.6E; Ex-1003, ¶138.

As discussed above, Aboulhosn’s peer component “controls the sharing of

files with other computer systems,” including “receiv[ing] a synchronization response message...[that] contains metadata for each file currently in the group.” Ex-1005, 8:48-51. Therefore, Aboulhosn transmits metadata via the peer component (*i.e.*, software client). Ex-1003, ¶139.

Therefore, Aboulhosn discloses “**providing by the at least one server** [*e.g.*, Aboulhosn’s GO as a server] **the single master meta-index** [*e.g.*, metadata for the entire shared folder when the GO comes online after being offline] **and meta-indices for each of the other multiple devices** [*e.g.*, metadata describing updates on each of the other member devices when each member device makes updates to a local file in the shared folder and the GO is already online] **to each of the multiple devices** [*e.g.*, each of the member devices M1, M2, and M3] **via the individual software clients** [*e.g.*, peer component on each member device].” Ex-1003, ¶¶132-140.

9. 1[H]: “**integrating metadata from the meta-indices of each of the other multiple devices into a local file system of each of the multiple devices to generate virtual files stored in the same locations as local files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices**”

Virtual files. The ’338 patent “creates a **virtual representation** of data on all of the devices using **metadata indexing**.” Ex-1001, 2:20-26. The claimed system purportedly differentiates local data vs. remote data, and “each client can create the **virtual representation of the remote data** within its local device file

system.” *Id.*, 5:14-18. Aboulhosn discloses the exact same thing. Ex-1003, ¶142.

Aboulhosn’s “files in the folder of a member may be **actual files** stored at that member, which contains the content of the shared file, or **virtual files** identifying the actual file that is stored at another member.” Ex-1005, 2:5-8; 2:12-15. Moreover, Aboulhosn’s “shared file is identified by **metadata stored in association with the virtual file** (e.g., as properties of the virtual file).” *Id.*, 2:8-9; 2:32-36; Ex-1003, ¶143.

Integrating metadata. Aboulhosn discloses that when a member device adds/modifies files in the shared folder, “the [other] members receive from [the updating] member a notification...[and u]pon receiving...the member **creates a virtual file** in their folder for the group **using the file system of that member.**” *Id.*, 2:24-32. Accordingly, when each of the member devices adds/modifies files in the shared folder, each member creates within its local file system virtual files corresponding to newly added files by all the other member devices. *See id.*, 6:56-58 (“the new member...**creates the appropriate virtual files** in the shared folder.”). A PHOSITA would have understood that such integration of metadata and creation of virtual files occur when each member device updates its shared folder (**purple**) after receiving message 626 (**blue**)—the claimed “individual meta-indices.”

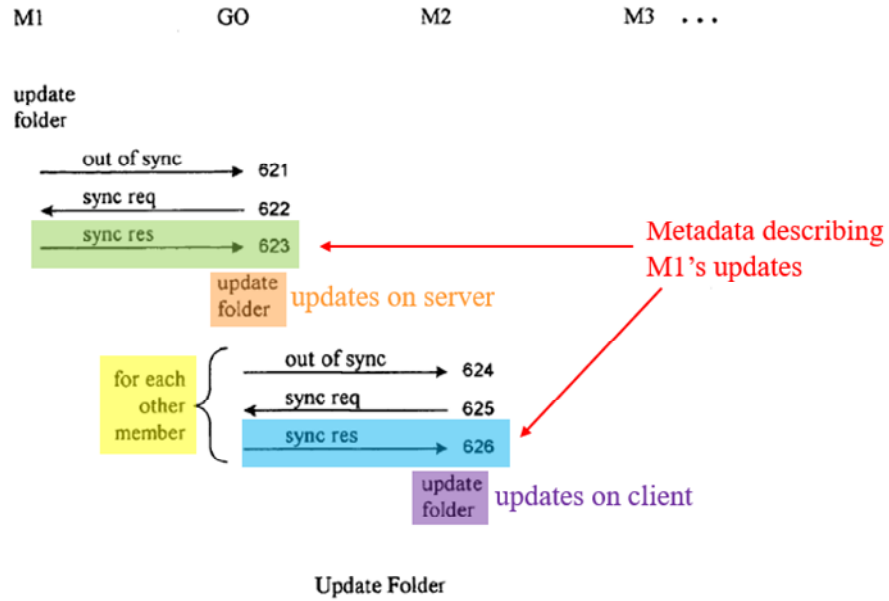


Fig. 6B

Ex-1005, Fig.6B. Such integration of metadata and creation of virtual files also occur when each member device updates its shared folder (purple) after receiving message 655 (blue)—the claimed “single master meta-index.”

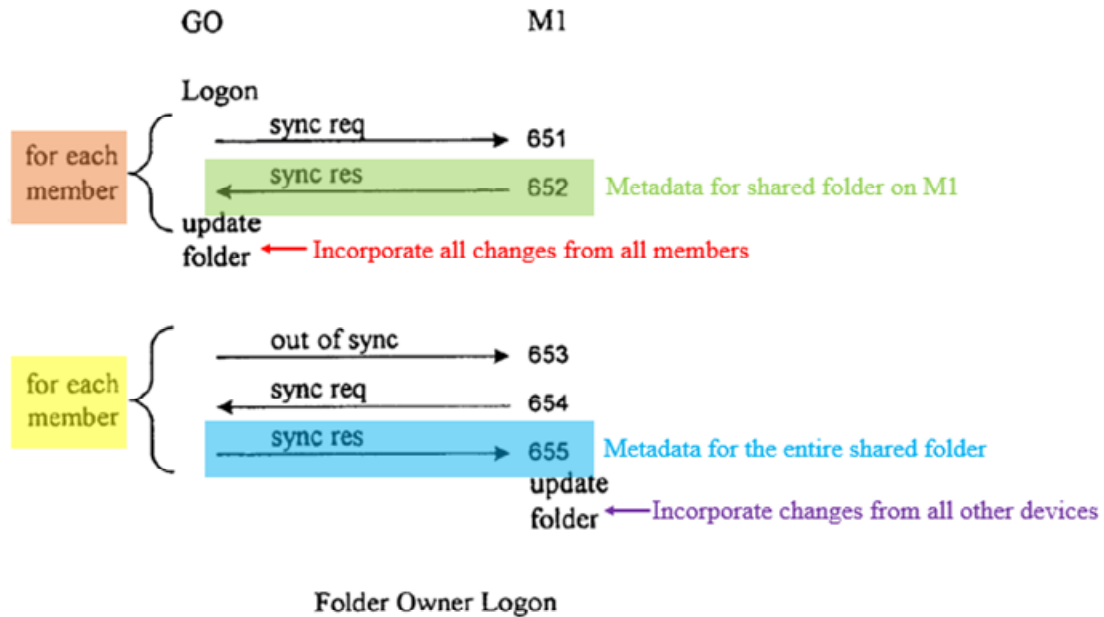


Fig. 6E

Ex-1005, Fig.6E; Ex-1003, ¶144.

Aboulhoshn illustrates in Figure 10 more details about how a member devices updates a shared folder. As shown below, when each member device receives a “synchronization response message [that] contains metadata for each file currently in the group,” the peer component “**create[es] new files** as necessary.” Ex-1005, 8:49-52.

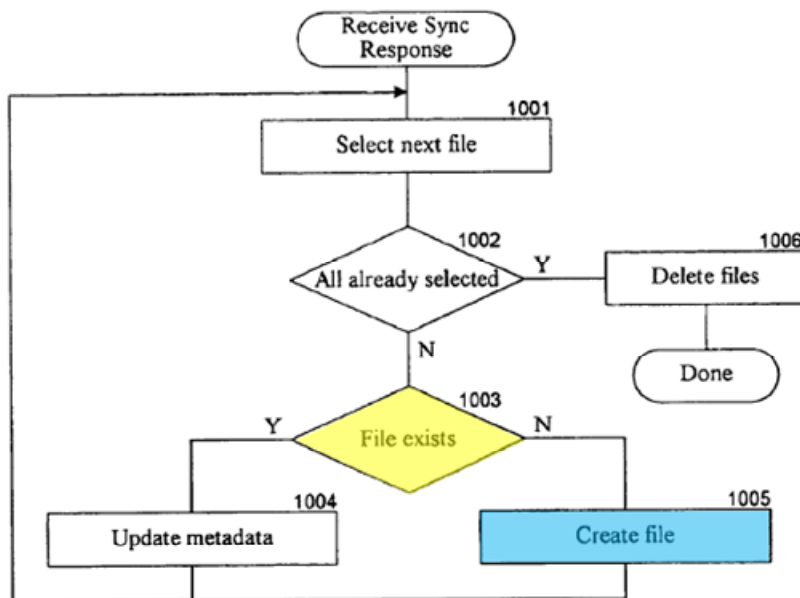


Fig. 10

Ex-1005, Fig.10. For each file in the received metadata, if the file does not exist (block 1003, yellow), “the [peer] component **creates a new virtual file** [block 1005, blue] based on the metadata for that file.” *Id.*, 8:63-64; claim 1. A PHOSITA would have understood that this process also happens when the metadata for less than all files in the shared folder is sent to a member device. Ex-1003, ¶145.

Same locations. In Aboulhosn, virtual files are identified by the “file name extension of ‘vf’.” Ex-1005, 4:31-32.

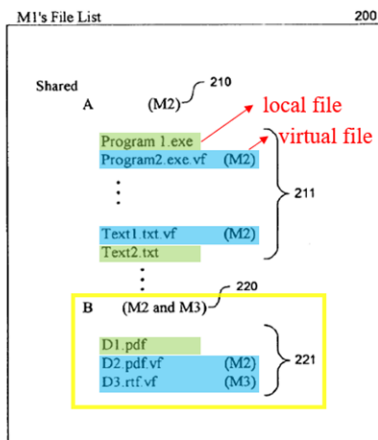


Fig. 2

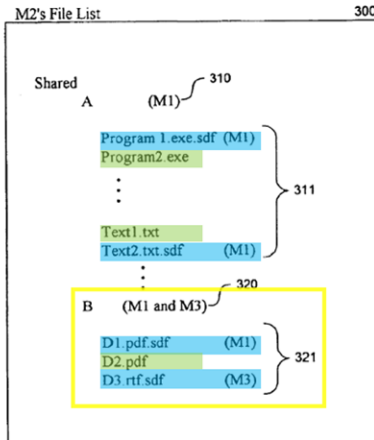


Fig. 3

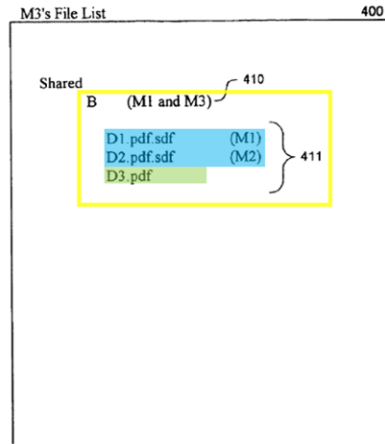


Fig. 4

Ex-1005, Figs. 2-4⁹ (virtual files in blue and local files in green); 4:25-49. Taking shared folder “B” (yellow) as an example, the shared folder B on each of M1, M2, and M3 includes both virtual file(s) (blue) and local file(s) (green). While Figures 2-4 above only illustrate M1, M2, and M3, each having a single local file and two virtual files in the shared folder B, a PHOSITA would have understood that each member device may have any number of local files and any number of virtual files, and these local and virtual files are stored in the same folder, *i.e.*, the same location. *See also* Ex-1009 (448 Application), p.11, 9:27-30; Ex-1003, ¶¶146-147.

Indistinguishability. While Aboulhosn does not disclose that its virtual files

⁹ While the virtual files in Aboulhosn’s Figures 3-4 have the file name extension of “sdf,” the relevant portions of the specification still describe “virtual files as indicated by the ‘vf’ extensions.” Ex-1005, 4:54-55. For purposes of this Petition, “vf” and “sdf” are treated the same to both indicate virtual files. Ex-1003, ¶146.

are “indistinguishable from the local files by the local file system,” Phillips does.

Ex-1003, ¶148.

Phillips discloses both (1) visual indistinguishability and (2) transparent access. Ex-1003, ¶149. Phillips’s system “access[es]...the designated files in a fashion which is **indistinguishable, by users of, and applications executing at,** the first client node, **with** access to one or more **files stored on a physical storage device that is locally present** at the first client node.” Ex-1006, claim 16.

Regarding visual indistinguishability, the ’338 patent states that “[t]he virtual files **appear** in essentially all ways **the same** as a local file, making them **indistinguishable....**” Ex-1001, 6:34-36. Phillips discloses the same: “the virtual storage device, and **its contents (i.e., all of the files, directories/folders, etc.** stored in the virtual storage device), **appears, to the client node user...to be locally present.**” Ex-1006, 14:62-66; Ex-1003, ¶150.

During prosecution of the ’260 *patent* (not the ’338 patent), the Applicant argued that Aboulhosn uses a different file extension (*i.e.*, “vf”) for virtual files and therefore “discriminate[s] and distinguish[es] between virtual files and local files.” Ex-1011, p.55. Phillips does not include a similar purported deficiency. Instead, Phillip’s system’s “[virtual] files ‘**appear,**’ **i.e., entirely behave...as if locally present on the client nodes.**” Ex-1006, 9:36-39; 13:60-63 (“The Windows NT™ operating system does not distinguish between such storage devices from

the perspective of **the graphical display to the user.**”). Thus, a PHOSITA would have understood Phillips to teach that its virtual files appear indistinguishable from local files, including file extensions. Ex-1003, ¶151.

Regarding indistinguishable access, the ’338 patent’s system “**transparently** perform[s] numerous commands to request, locate and retrieve a physical copy of the virtual file **without the knowledge of the requesting application or operating system.**” Ex-1001, 8:57-61. To do so, the ’338 patent’s “software client **intercepts** the operation request,” retrieves the remote file from a remote device, and performs “the operation...on the file at the local device.” *Id.*, 6:49-55. Phillips discloses the same. Ex-1003, ¶152.

When Phillips’s “application causes an access to another file...[i]f the file is contained in the virtual storage device [*i.e.*, a virtual file], the client node software **intervenes and assists the operating system** in identifying the appropriate file and in **providing the data of the file to the operating system** to complete the access to the file (*i.e.*, read, write, modify, delete, etc.)[.] The client node software does this **transparently and automatically without requiring intervention by the user.**” Ex-1006, 14:48-60; *see also*, 9:39-42 (“Any file or directory information transfer and integrity maintenance is performed **transparently to the user and applications...as if they were locally present.**”), claim 16. Thus, a PHOSITA would have understood that Phillips’s virtual file access is transparent

to the user, the application, and the operating system. Ex-1003, ¶153.

Therefore, Aboulhosen in view of Phillips discloses **“integrating metadata from the meta-indices of each of the other multiple devices [e.g., metadata for modified or newly added files by each of the other member devices in Aboulhosen] into a local file system of each of the multiple devices to generate virtual files [e.g., Aboulhosen’s “virtual files”] stored in the same locations [e.g., in the same shared folder B] as local files [e.g., Aboulhosen’s “actual files”] of the local file system, the virtual files indistinguishable from the local files by the local file system [e.g., Aboulhosen’s virtual files as modified by Phillips to (1) appear visually indistinguishable to local files, and/or (2) be accessed transparently to the user, application, and operating system] at each of the multiple devices.”** Ex-1003, ¶¶141-154.

10. 1[I]: “continually updating the single master meta-index on the at least one server and each of the multiple devices in response to changes to the data indexed thereon”

As discussed above, Aboulhosen’s Figure 6B illustrates “message flows when a member of the group **updates the group folder.**” Ex-1005, 6:59-62. When M1 updates the shared folder, “[t]he group owner upon receiving the metadata updates [orange] [] the metadata associated with the shared folder.” *Id.*, 7:1-3.

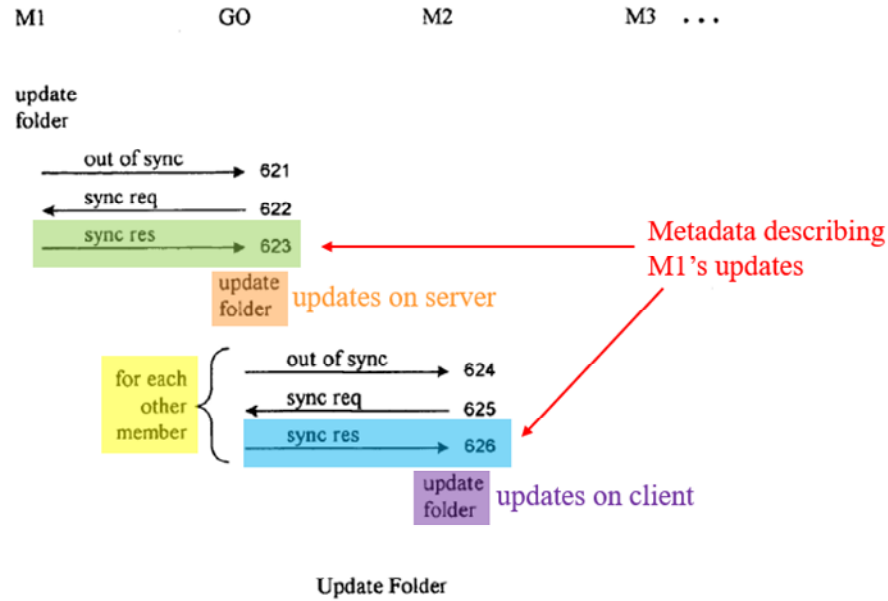


Fig. 6B

Ex-1005, Fig.6B. Thereafter, “[u]pon receiving the metadata (blue), the member updates [purple] its folder,” including updating the local version of the metadata for the shared folder. *Id.*, 7:10-11; Ex-1003, ¶156.

Figure 10 confirms that when data changes on a member device, each of the other member devices can “update[] the metadata for the existing file” (1004, green) or “delete[] any virtual files of the shared folder that is not represented by the metadata” (1006, red). *Id.*, 8:61, 8:65-57.

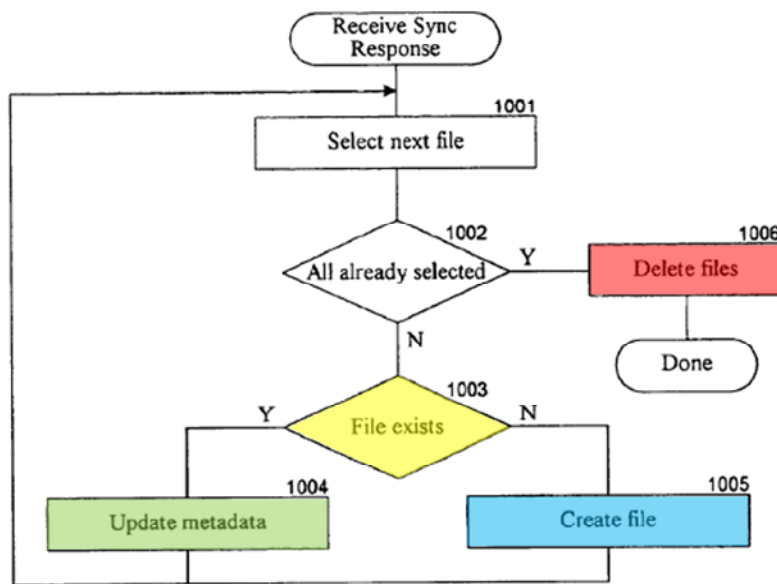


Fig. 10

Ex-1005, Fig.10; Ex-1003, ¶157.

A PHOSITA would also have understood that the member device initiating the data change to an existing file of the shared folder necessarily updates the file’s local metadata and thereby updates the local metadata for the shared folder. Therefore, Aboulhosn’s single master meta-index (*e.g.*, the metadata for the shared folder), which is maintained by both the GO and the member devices, is updated in response to data changes to files already in the shared folder. *See also*, Ex-1005, claim 1; Figs. 6B, 6D, 6E; Ex-1003, ¶158.

Since the above synchronization process occurs whenever there is a data change, it is performed continually. Ex-1003, ¶159.

Therefore, Aboulhosn discloses “**continually updating the single master**

meta-index [e.g., metadata for the shared folder is updated whenever there is a change] **on the at least one server** [e.g., Aboulhosn's GO as a server] **and each of the multiple devices** [e.g., each of the member devices M1, M2, and M3] **in response to changes to the data indexed thereon** [e.g., modifying, adding, or deleting file(s) in the shared folder]." Ex-1003, ¶¶155-160.

11. 1[J]: **"wherein the individual software clients facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index by modifying file systems of each of the multiple devices to include virtual files for data from the single meta-data index that is not local to a multiple device."**

First, for reasons explained in Section IX.A.9 (1[H]), Aboulhosn discloses that "the individual software clients facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index...to include virtual files for data from the single meta-data index that is not local to a multiple device." Ex-1003, ¶162.

Second, Aboulhosn discloses **"modifying file systems** of each of the multiple devices to include virtual files." Aboulhosn's system includes a file system 512 (red), which "may be a conventional file system provided by an operating system." Ex-1005, 5:14-15; claim 1 ("creating a virtual file using a **file system** of the first computer system").

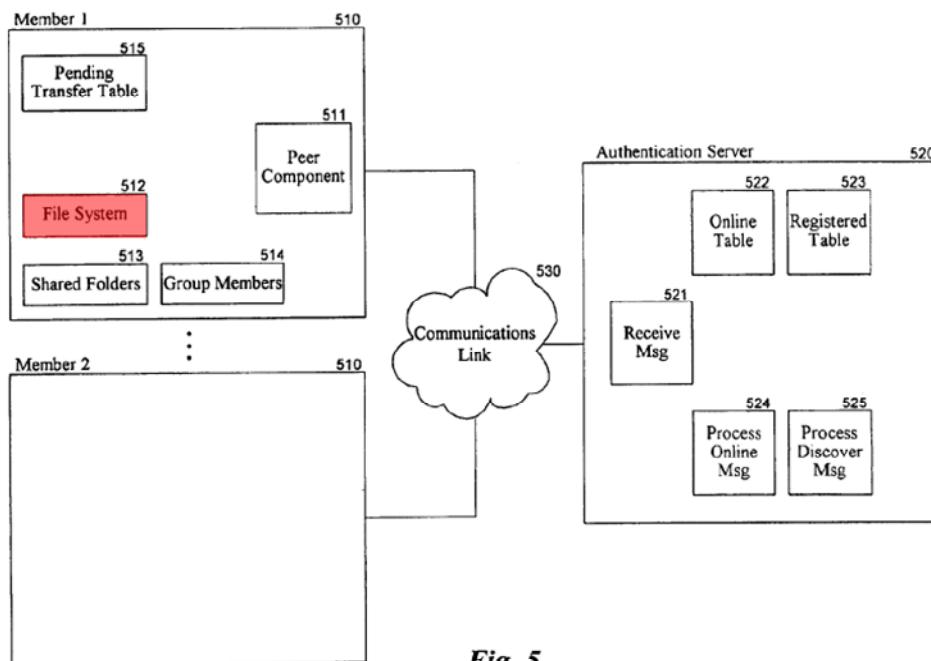
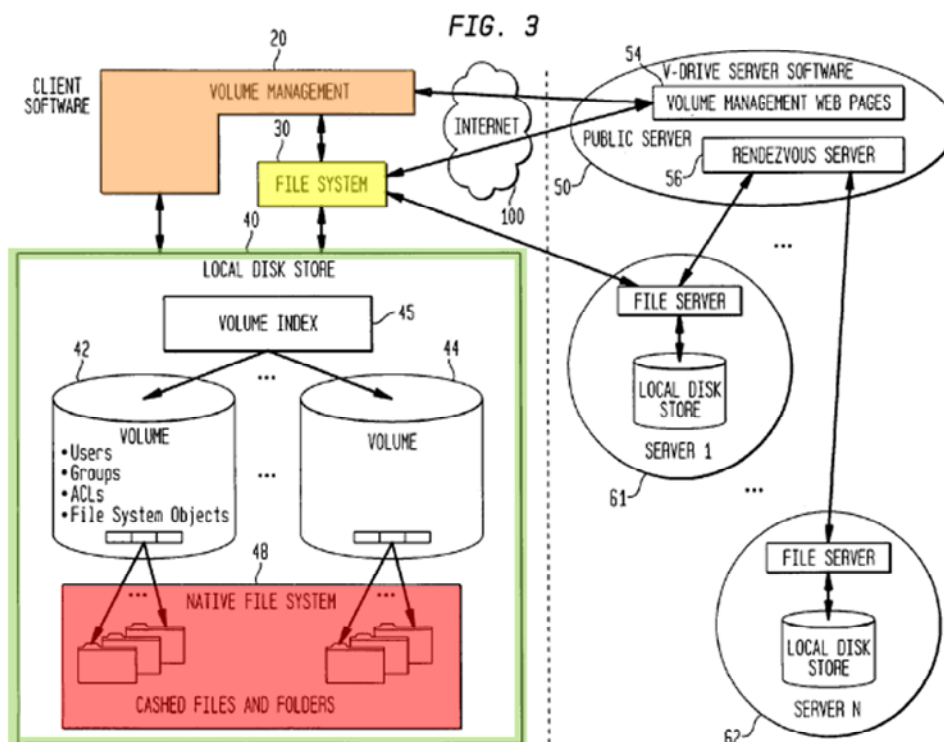


Fig. 5

Ex-1005, Fig.5. Aboulhoshn also discloses that “a virtual file component receives a notification from the file system.” *Id.*, claim 3. A PHOSITA would have understood that Aboulhoshn’s virtual file system—including at least the implementation of shared folders and the sending of notifications to Aboulhoshn’s virtual file component—are not part of a conventional operating system and are accomplished through at least the peer component 511 “downloaded from [Aboulhoshn’s] authentication server.” *Id.*, 5:7-8; claim 39 (“a virtual file component that creates a virtual file”). Therefore, a PHOSITA would have understood that to implement Aboulhoshn’s system, including creation of virtual files and providing notifications when virtual files are accessed, the conventional file system of each member device is necessarily modified. Ex-1003, ¶163.

Third, to the extent PO argues that Aboulhosn does not disclose modifying a file system, Phillips does. Phillips discloses “three client node software elements, namely, the volume management [orange], file system [yellow] and disk subsystem [green]. These software elements are designed to **integrate with a conventional operating system/native file system 48** [red] which may be sold with the client node.” Ex-1006, 13:7-11.



Ex-1006, Fig.3. Phillips elaborates that such integration is OS-specific: “For example, Microsoft™ specifies an API for integrating software **affecting the manner by which files are identified and retrieved by other applications and programs** executed within the Windows NT™ operating system.” Ex-1006, 13:16-20. How files are identified and retrieved is the responsibility of the file

system, and, thus, software that would “affect” this process necessarily requires modifying the file system. Therefore, Phillips discloses implementing its system, including creating virtual files, by modifying the file system, such as by “integrat[ing software elements] with the...native file system.” *Id.*, 13:12-16; Ex-1003, ¶164.

Therefore, Aboulhosn in view of Phillips discloses “**wherein the individual software clients** [e.g., Aboulhosn’s peer component 511 on each member device] **facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index** [e.g., metadata for the entire shared folder] **by modifying file systems** [e.g., modifying Aboulhosn’s existing file systems to communicate with the installed peer components, or modifying Aboulhosn’s existing file systems to integrate with the installed peer components as taught by Phillips] **of each of the multiple devices to include virtual files** [e.g., Aboulhosn’s “virtual files”] **for data from the single meta-data index that is not local to a multiple device.**” Ex-1003, ¶¶161-165.

B. Motivation to Combine Aboulhosn and Phillips

Aboulhosn and Phillips are **analogous art**, at least because they are in the **same field of endeavor** as the ’338 patent, *i.e.*, file sharing and synchronization. The ’338 patent and both references are in Cooperative Patent Classification (CPC) class G06F and U.S. class 707. All disclose a client component residing on a client

device to facilitate file sharing and synchronization. Ex-1001, claim 1; Ex-1005, 5:6-14; Ex-1006, 11:16-67. Moreover, all relate to the same problem of needing to reduce storage space occupied by shared files on a client device and endeavor to solve that problem in a similar manner by generating virtual files for files that are shared between multiple devices. Ex-1001, Abstract; Ex-1005, 2:32-36; Ex-1006, 14:62-66. When a client device accesses a virtual file, all three references disclose transmitting the actual file from the remote device to the client device to allow operations on the file. Ex-1001, 8:57-61; Ex-1005, 2:15-18; Ex-1006, 14:38-42, 28:21-31. Thus, at a minimum, Aboulhosn and Phillips are directly focused on addressing the same problem identified in the '338 patent regarding files occupying too much space on a local device by keeping a copy of all shared files on each device. Ex-1001, 1:40-46; Ex-1005, 2:20-23; Ex-1006, 2:60-63, 11:59-61. Like the '338 patent, Aboulhosn and Phillips address this problem by generating virtual files. Ex-1001, Abstract; Ex-1005, 2:32-36; Ex-1006, 14:62-66; Ex-1003, ¶166.

Indistinguishability. A PHOSITA would have been motivated to incorporate Phillips's virtual file features, such as visual indistinguishability and transparent access, into Aboulhosn's system. Ex-1003, ¶167.

A PHOSITA looking to provide a smoother and more seamless user experience with Aboulhosn's system would have been motivated to incorporate

Phillips's **visual indistinguishability feature** (*i.e.*, displaying virtual files to the user in the same way as local files) to Aboulhosn's system. In this way, "the client user...is [not] aware of the actual location or home of the files as the integration is **perfectly transparent and seamless.**" Ex-1006, 15:4-7. By presenting virtual files as indistinguishable to local files, users accessing a file can defer to software to automatically perform these steps. *See* Ex-1006, 14:58-60 ("The client node software does this **transparently and automatically without requiring intervention by the user.**"). This provides the perception that all the shared files are synced/stored locally while the local disk drive need only provide minimal space for the remote/virtual files. For users that are not familiar with Aboulhosn's file extension naming conventions, removing Aboulhosn's special virtual file extension "vf" also avoids confusion. Ex-1003, ¶¶168-169.

A PHOSITA would also have been motivated to incorporate Phillips's **transparent access feature** for the virtual files, *i.e.*, accessing files transparently to the user, application, and operating system. When accessing a remote file, both Aboulhosn and Phillips disclose retrieving the remote file to the local device to allow operations. Ex-1005, 2:15-18; Ex-1006, 14:38-42, 28:21-31. Because Aboulhosn does not provide details on how such file retrieval is implemented, a PHOSITA implementing Aboulhosn's system would have been motivated to look to other references, like Phillips, for details of how to access remote files. For

example, Phillips teaches that “the application generat[ing] the appropriate request to the operating system to perform the appropriate file access operations” and “the client node software intervenes and assists the operating system in identifying the appropriate file and in providing the data of the file to the operating system to complete the access to the file (i.e., read, write, modify, delete, etc.).” Ex-1006, 14:52-58. Phillips goes further, teaching that “[t]he client node software does this **transparently and automatically without requiring intervention by the user,**” and that “[i]n essence, neither the client user nor the application executing at the client node is aware of the actual location or home of the files as the integration is **perfectly transparent and seamless.**” Ex-1006, 14:58-60, 15:4-7. Therefore, Phillips’s implementation of remote file access also provides the benefit of a better, smoother, more efficient, and more seamless user experience. Ex-1003, ¶170.

As Dr. McDaniel explains, when a user wishes to access a file that is stored remotely, Phillips automatically retrieves the file content on behalf of the user. In this way, the user needs not be concerned about whether the file is local or not. Ex-1003, ¶170.

A PHOSITA would have had a **reasonable expectation of success** in incorporating Phillips’s visual indistinguishability feature and transparent access feature into Aboulhosn’s system. Both systems employ client software to facilitate virtual file creation and enable remote file access from a client device. Ex-1005,

5:6-14, 7:16-24; Ex-1006, 11:22-67, 14:54-58. In order to display virtual files and local files in the same manner as taught by Phillips, a PHOSITA would have understood that the modifications to Aboulhosn's system merely include removing the "vf" extensions for virtual files, *e.g.*, removing ".vf" from "D2.pdf.vf." *See id.*, Fig. 2. Aboulhosn's peer component need not rely on the "vf" extensions (to the extent it did) to determine whether a file is local or remote because Aboulhosn's "metadata may identify...the file owner." Ex-1005, 2:28-30. A PHOSITA would have understood that changing file extensions, including removing special file extensions, could be performed using simple and well-known techniques employed in file system naming implementations and that this change would have resulted in a working system. With respect to incorporating Phillips's transparent access feature, since Aboulhosn does not provide details on how to implement the file system for access, a PHOSITA would have looked to Phillips and would have expected the combination to result in a working system for the above reasons. Ex-1003, ¶171.

Network communications. To the extent Aboulhosn were found to not disclose the claimed "web-based system" (it does), a PHOSITA would have been motivated to incorporate Phillips's use of http/https protocols for network communications into dispersed network systems, such as Aboulhosn's system. Aboulhosn's computer systems and servers communicate "via...signal[s] on a

communications link [yellow]...such as the **Internet**, a local area network, a wide area network, or a point-to-point dial-up connection.” Ex-1005, 5:57-61.

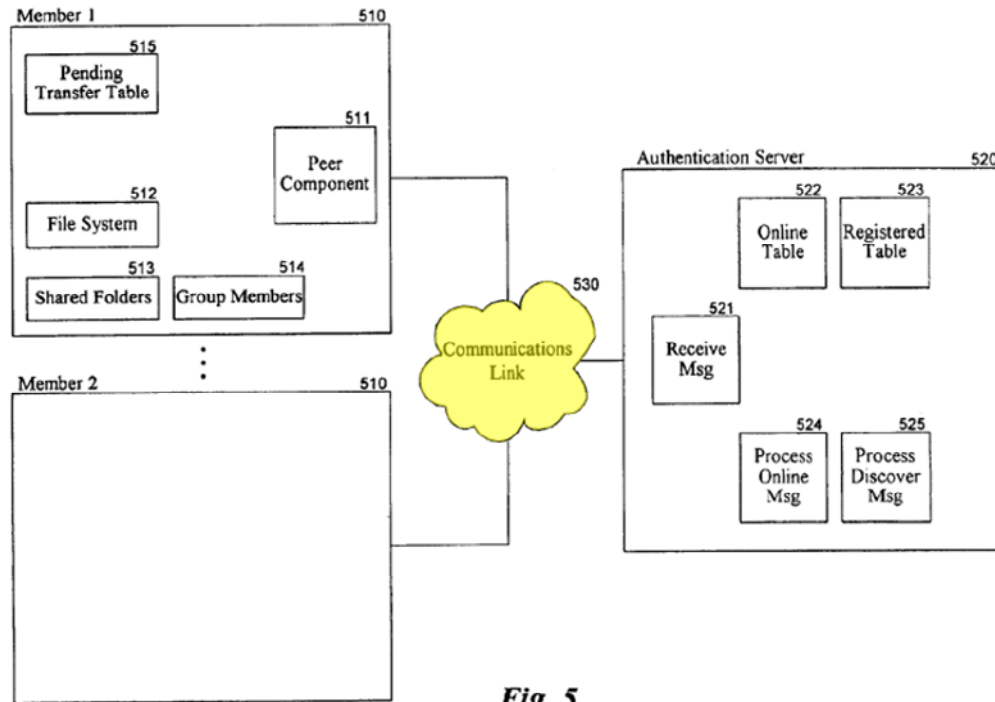


Fig. 5

Ex-1005, Fig.5. Because Aboulhosn discloses using an Internet-based communications link as well as use of FTP protocol via the Internet (Ex-1005, 1:24-25), a PHOSITA would have been motivated to use, and seek out a reference disclosing, common web-based Internet protocols such as http/https used in Phillips’s web-based file-sharing and synchronization system. *See* Ex-1006, 8:9-14 (“Communication is achieved in the **Internet** using a hierarchy of protocols, including...**the hypertext transfer protocol (http) and the hypertext transfer protocol over secured sockets layer (https).**”); Ex-1003, ¶¶172-173.

To the extent the claims require a web browser, a PHOSITA would have

been motivated to incorporate Phillips's web browser into Aboulhosn's Internet-based system. As detailed in Sections IX.A.2-IX.A.4, Aboulhosn discloses receiving user information, installing an individual software client, and accepting registration of multiple devices, all via its Internet-based system. A PHOSITA implementing Aboulhosn's system would have been motivated to incorporate Phillips's web browser as a specific user interface to receive user information, to download the software client, and to enable GO's management functionalities, including accepting device registration, which was common at the time of the '338 patent. Moreover, to solve the "unfamiliar user interface" problem identified in Aboulhosn (Ex-1005, 1:25-30), a PHOSITA would have been motivated to incorporate Phillips's web browser, which is the most common and standardized interface for providing these services. Ex-1003, ¶¶174-176.

A PHOSITA would have had a **reasonable expectation of success** in incorporating Phillips's http/https protocol and web browser in Aboulhosn's system. As mentioned above, like FTP disclosed in Aboulhosn, http/https is one of the most widely used protocols for Internet communications and was almost certainly used for Aboulhosn's Internet communications. To the extent it was not, it would have been simple for a PHOSITA to utilize the http/https protocol for Aboulhosn communications link. It would also have been simple and routine to implement a web browser in Aboulhosn's system for account/device registration

and file sharing. Ex-1003, ¶177.

Receiving user information. To the extent Aboulhosn is found to not disclose receiving user information (it does), a PHOSITA would have been motivated to incorporate Phillips’s creation of accounts into Aboulhosn’s system. As explained in Section IX.A.2, Aboulhosn discloses creating a group of authorized users to access a shared folder. Ex-1005, claim 39. A PHOSITA would have been motivated to look to other references, like Phillips, for details, including receiving user information to create accounts. Implementation of such a process is simple and routine and would have resulted in a working system. Ex-1003, ¶178.

Modifying file systems. To the extent Aboulhosn is found to not disclose modifying file systems (it does), a PHOSITA would have been motivated to incorporate Phillips’s disclosure of modifying file systems into Aboulhosn’s system. As explained in Section IX.A.11, Aboulhosn discloses a peer component that “controls the sharing of files with other computer systems.” Ex-1005, 5:6-9. A PHOSITA looking to deploy the peer component on multiple devices would have been motivated to look to other references, such as Phillips (which also discloses virtual files), for details of how software interacts with existing file systems. Given that Phillips discloses implementing its invention on a very common file system, *e.g.*, by modifying Microsoft™ file systems via a Microsoft™-specified API, a PHOSITA would be motivated to implement

Aboulhosn in a similar way, which a PHOSITA would have expected to result in a working system. Ex-1003, ¶179.

C. Claim 2

Claim 2 depends from claim 1, which is rendered obvious by Aboulhosn-Phillips. *See* Section IX.A. Claim 2 further recites “**wherein the individual software clients vary according to the individual operating systems of each of the multiple devices,**” which is disclosed by Aboulhosn. Ex-1003, ¶180.

Aboulhosn teaches that each member device includes a peer component that provides various file-sharing functionalities and “a conventional file system provided by an operating system.” Ex-1005, 5:14-15. A PHOSITA would have understood that each operating system requires its own file system that contains structures such as directories, metadata, file names, etc., and allows system calls such as open, close, read, write, etc. Thus, for Aboulhosn’s invention to be integrated with a conventional file system provided by one or more standard operating systems, Aboulhosn’s peer component necessarily needs to work with the particular operating system. Ex-1003, ¶181.

This is confirmed by the ’448 Application (“incorporated by reference in its entirety” in Aboulhosn), which confirms that “[f]or each computer, the Local File Share Enabling Software is **necessarily adapted to the operating system** and file manager of the computer.” Ex-1009, pp.8-9, 6:30-7:2. Thus, a PHOSITA reading

Aboulhosn and the incorporated '448 Application would have appreciated that the peer component can be adapted to the operating system that it is running on. Ex-1003, ¶182.

To the extent it is found Aboulhosn does not disclose this limitation, Phillips discloses it. Phillips discloses that “[t]he manner by which the client node software is integrated with the operating system/native file system 48 may be **specific to each operating system/native file system 48** and is normally dictated by specification and application programming interfaces of the operating system/native file system creator.” *See* Ex-1006, 13:11-16. Therefore, a PHOSITA would have also found it obvious to adapt Aboulhosn’s system to the specific operating system based on Phillips’s teachings and would have expected a reasonable expectation of success. *See* Ex-1006, 13:25-30 (“Those skilled in the art will appreciate how to modify the client node software for each operating system/native file system....”); Ex-1003, ¶183.

D. Claim 5

Claim 5 depends from independent claim 1, which is rendered obvious by Aboulhosn-Phillips. *See* Section IX.A. Claim 5 further recites “**wherein the individual software clients facilitate creation of a visual representation of the virtual files on a remote one of each of the multiple devices that is indistinguishable from a visual representation of an actual file that is located**

on a local one of the multiple devices,” which is disclosed by Aboulhosn-Phillips for reasons explained in Section IX.A.9 (1[H]). Ex-1003, ¶184.

E. Claim 6

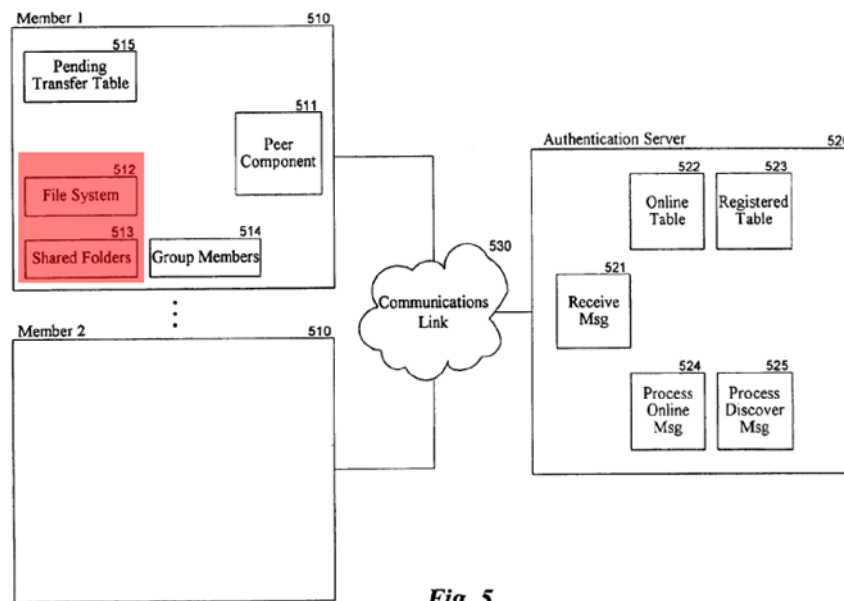
Claim 6 depends from independent claim 1, which is rendered obvious by Aboulhosn-Phillips. *See* Section IX.A. Claim 6 further recites “**wherein the meta-data includes at least information regarding file name, file type, file size, local path the file is stored in, date created, and date modified,**” which is disclosed by Aboulhosn. Ex-1003, ¶185.

Aboulhosn discloses that “the metadata may identify the **file name**, the file owner, the **create date** of the file, the last **modified date** of the file, **the size of the file**, and so on.” Ex-1005, 2:28-30. A PHOSITA would understand that such metadata would also include the **local path that the file is stored in**. Most file systems available at the relevant time were (and still are) organized hierarchically via directories, wherein files can be placed within a series of directories or folders. Aboulhosn discloses such a hierarchical organization: “a shared folder may contain shared **subfolders**.” Ex-1005, 4:20-23. File systems consult file metadata to determine their local paths (*i.e.*, specific directories). *See* Ex-1029, p.3. Therefore, a PHOSITA would have understood that the communication of metadata must include (or it would be obvious to include) the structure of the file system (*i.e.*, the local path of the files). Ex-1003, ¶186.

F. Claim 7

1. 7[P]: “A system for establishing a singular file system across multiple devices”

Aboulhosn discloses “[a] process for establishing a singular file system across multiple devices.” *See* Section IX.A.1 (preamble 1[P]). This process is performed by Aboulhosn’s system, which is illustrated in Figure 5 below. Ex-1003, ¶188.



Ex-1005, Fig.5 (Aboulhosn’s singular file system in red).

2. 7[A]: “a web-accessible server”

As explained in Section IX.A.2 (1[A]), Aboulhosn’s GO computer is a server, which communicates via the Internet and is therefore a “web-accessible server.” Ex-1003, ¶189.

To the extent PO argues that Aboulhosn’s GO server is not “web-

accessible,” the GO server modified to use Phillips’s http/https protocol and/or host a web-server to communicate with a web browser, discloses this limitation. Therefore, for the same reasons discussed above, Aboulhosn in view of Phillips renders obvious this limitation. *See* Section IX.A.2 (1[A]); Ex-1003, ¶190.

3. 7[B]: “at least one software client plug-in”

Both Aboulhosn and Phillips disclose a software client. *See* Section IX.A.3 (1[B]). According to the ’338 patent, a “plug-in” is merely a “form” “[t]he software client is provided in.” Ex-1001, 7:39-40. In general, a “plug-in” refers to “[a] small software program that **plugs into a larger application to provide added functionality.**” Ex-1012, p.3; *see also* Ex-1013, pp.3-4 (defining “plug-in” as “[a] program which is used in association with a larger program, to provide the latter with additional functionality”); Ex-1003, ¶192.

Aboulhosn’s peer component is such a “software client plug-in” because it plugs in to the member device’s file systems (*i.e.*, by modifying file systems, *see* Section IX.A.11) and provides additional functionalities, such as “registering a computer system, placing a computer system online, creating groups, inviting computer systems to become members of a group, sending updates to metadata, and so on.” Ex-1005, 5:9-14; Ex-1003, ¶193.

To the extent PO argues that Aboulhosn does not disclose modifying file system, Phillips discloses it. *See* Section IX.A.11. In particular, like the ’338

patent's plug-in, Phillips's "client node software **intervenes** and assists the operating system in identifying the appropriate file and in providing the data of the file to the operating system to complete the access to the [virtual] file." Ex-1006, 14:54-58; *cf.* Ex-1001, 8:23-25 ("The software client described herein acts as an operating system plug-in to **intercept** calls made to files and programs in the file system of the respective user devices."). Therefore, Aboulhosn's peer component as modified by Phillips is a "software client plug-in" because it plugs in to each member device's existing file system to provide additional functionalities. *See* Ex-1006, 11:22-12:20; Ex-1003, ¶194.

4. 7[C]: "multiple devices for storing and operating on files"

Aboulhosn discloses this limitation because, as detailed in Sections IX.A.1-IX.A.2 (1[P] and 1[A]), Aboulhosn discloses multiple devices, *e.g.*, member devices, such as M1, M2, and M3, which store and operate on files. *See, e.g.*, Ex-1005, Figs. 6B-6C; Ex-1003, ¶195.

5. 7[D]

7[D] is substantially the same as the combination of limitations 1[A-C] and claim 2 and is disclosed for the same reasons.¹⁰ *See* Sections IX.A.2-IX.A.4, IX.B; Ex-1003, ¶196.

¹⁰ For details of the limitations, see claim listing at the end of this document.

Limitation 7[D]	Claims 1 and 2	Sections
7[D][1]	1[A]	IX.A.2
7[D][2]	1[B]	IX.A.3
7[D][3]	1[C]	IX.A.4
7[D][4]	Claim 2	IX.C

6. 7[E]

7[E] is substantially the same as the combination of limitations 1[D-E] and is disclosed for the same reasons. *See* Sections IX.A.5-IX.A.6; Ex-1003, ¶197.

Limitation 7[E]	Claim 1	Sections
7[E][1]	1[D]	IX.A.5
7[E][2]	1[E]	IX.A.6

7. 7[F]

7[F] is substantially the same as the combination of limitations 1[E-I] and is disclosed for the same reasons. *See* Sections IX.A.6-IX.A.10; Ex-1003, ¶198.

Limitation 7[F]	Claim 1	Sections
7[F][1]	1[E]	IX.A.6
7[F][2]	1[F]	IX.A.7
7[F][3]	1[G]	IX.A.8
7[F][4]	1[H]	IX.A.9
7[F][5]	1[I]	IX.A.10

8. 7[G]

7[G] is identical to 1[J] and is disclosed for the same reasons. *See* Section IX.A.11; Ex-1003, ¶199.

G. Claim 8

Claim 8 depends from claim 7 (which is rendered obvious by Aboulhosn in view of Phillips, *see* Section IX.F), is substantially the same as 7[G], and is disclosed for the same reasons. *See* Section IX.F.8; Ex-1003, ¶200.

H. Claim 9

Claim 9 depends from claim 8 (which is rendered obvious by Aboulhosn in view of Phillips, *see* Section IX.G), is substantially the same as claim 5, and is disclosed for the same reasons. *See* Section IX.D; Ex-1003, ¶201.

I. Claim 10

- 1. 10[P]: “A non-transitory computer-readable storage medium storing a set of instructions that, when executed by a processor, cause the processor to perform operations”**

To the extent that 10[P] is limiting, Aboulhosn discloses it. Aboulhosn discloses that “[t]he computer systems and servers may include a **central processing unit** [*i.e.*, a processor], **memory**,...and **storage devices** (e.g., **disk drives**) [*i.e.*, non-transitory computer-readable storage mediums], ” and that the “memory and storage devices are computer-readable media that may contain instructions that implement the file sharing system.” Ex-1005, 5:50-53; Ex-1021, p.1. A PHOSITA would have understood that the instructions that implement the

file-sharing system is executed by Aboulhosn’s CPU. Ex-1003, ¶203.

Therefore, Aboulhosn discloses “[a] **non-transitory computer-readable storage medium** [*e.g.*, computer-readable media, such as memory and storage devices] **storing a set of instructions that, when executed by a processor** [*e.g.*, central processing unit], **cause the processor to perform operations** [*e.g.*, instructions that implement the file sharing system].” Ex-1003, ¶204.

2. 10[A-E]

Limitations 10[A-E] collectively are substantially the same as limitations 1[A, C-D, F-J] and disclosed for the same reasons.¹¹ See Sections IX.A.2, IX.A.4-IX.A.5, IX.A.7-IX.A.11; Ex-1003, ¶205.

Limitations 10[A-E]	Claim 1	Sections
10[A]	1[A]	IX.A.2
	1[C]	IX.A.4
10[B]	1[D]	IX.A.5
10[C]	1[F]	IX.A.7
10[D]	1[G]	IX.A.8
	1[H]	IX.A.9
10[E]	1[J]	IX.A.11

¹¹ For details of the limitations, see claim listing at the end of this document.

J. Claim 11

Claim 11 depends from claim 10, which is rendered obvious by Aboulhosn in view of Phillips. *See* Section IX.I. Claim 11 is substantially the same as 1[I] and disclosed for the same reasons. *See* Section IX.A.10; Ex-1003, ¶206.

K. Claim 12

Claim 12 depends from claim 10, which is rendered obvious by Aboulhosn in view of Phillips. *See* Section IX.I. Claim 12 further recites “**updating the single master meta-index on each of the multiple devices in response to changes to meta-indices of a local file of one of the multiple devices,**” which is substantially the same as 1[I] except that claim 12 requires “updating the single master meta-index on each of the multiple devices in response to **changes to meta-indices** of a local file” as opposed to “changes to the data.” Ex-1003, ¶207.

A PHOSITA would have understood that modifying an existing file in the Aboulhosn-Phillips system necessarily changes its associated metadata. As detailed in Section IX.E (claim 6), the meta-data in Aboulhosn-Phillips system includes file name, file type, file size, date created, and date modified. Therefore, when a local file’s content is modified, its “date modified,” and possibly “file size,” changes. When a local file’s file name is modified, its “file name” changes. Therefore, claim 12 is disclosed for the same reasons provided in Section IX.A.10 (1[I]). Ex-1003, ¶208.

L. Claim 13

Claim 13 depends from claim 10, which is rendered obvious by Aboulhosn in view of Phillips. *See* Section IX.I; Ex-1003, ¶209. Claim 13 further recites **“updating the single master meta-index on each of the multiple devices in response to changes to a local file of a first device, the local file corresponding to a virtual file of a second device, the local file system of the second device retrieving the local file from the first device.”**

As explained in Section IX.A.10 (1[I]), Aboulhosn discloses “updating the single master meta-index on each of the multiple devices in response to changes to a local file of a first device” required by claim 13. Ex-1003, ¶210.

Aboulhosn also teaches “the local file corresponding to a virtual file of a second device.” *See, e.g.*, Ex-1005, 2:7-8 (“virtual files identifying the actual file that is stored at another member”); Figs. 2-4; Ex-1003, ¶211.

Finally, Aboulhosn discloses “the local file system of the second device retrieving the local file from the first device.” *See, e.g.*, Ex-1005, claim 22 (“when the virtual file is accessed, retrieving the file stored at the second computer system using the metadata associated with the virtual file”); Ex-1003, ¶¶212-213.

M. Claim 14

Claim 14 depends from independent claim 10, which is rendered obvious by Aboulhosn-Phillips. *See* Section IX.I. Claim 14 is substantially the same as 10[D]

and disclosed for the same reasons. Ex-1003, ¶214.

X. GROUND 2: CLAIMS 3-4 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS AND TSANG

A. Claim 3

Claim 3 depends from claim 1 (which is rendered obvious by Aboulhosn-Phillips, *see* Section IX.A) and further recites “**wherein registration of the multiple devices includes selection of categories of data for each of the multiple devices to be inventoried,**” which is disclosed by Aboulhosn in view of Phillips and Tsang. Ex-1003, ¶215.

As detailed in Section IX.A.4 (1[C]), Aboulhosn discloses accepting registration of multiple devices. Aboulhosn also discloses selecting data, *e.g.*, files, to add to the group folder. *See* Section IX.A.5 (1[D]); *see also* Ex-1009, p.12, 10:9-11 (“the user...select[s] with his local file manager one or more files...to upload or push to other users in the group.”). While Aboulhosn does not disclose selecting “categories of data” when registering a device, Tsang discloses it in Figure 6: “a process 600 for creating partnership data that occurs **when a partner computing device is added to an account.**” Ex-1008, 6:59-61. As part of this process, Tsang discloses that “[a]t block 610 [yellow], a **list of local folders may be identified.** The list **identifies the folders to include** (*i.e.*, ‘share’) in the combined file space and their corresponding mapped locations.” *Id.*, 7:14-17.

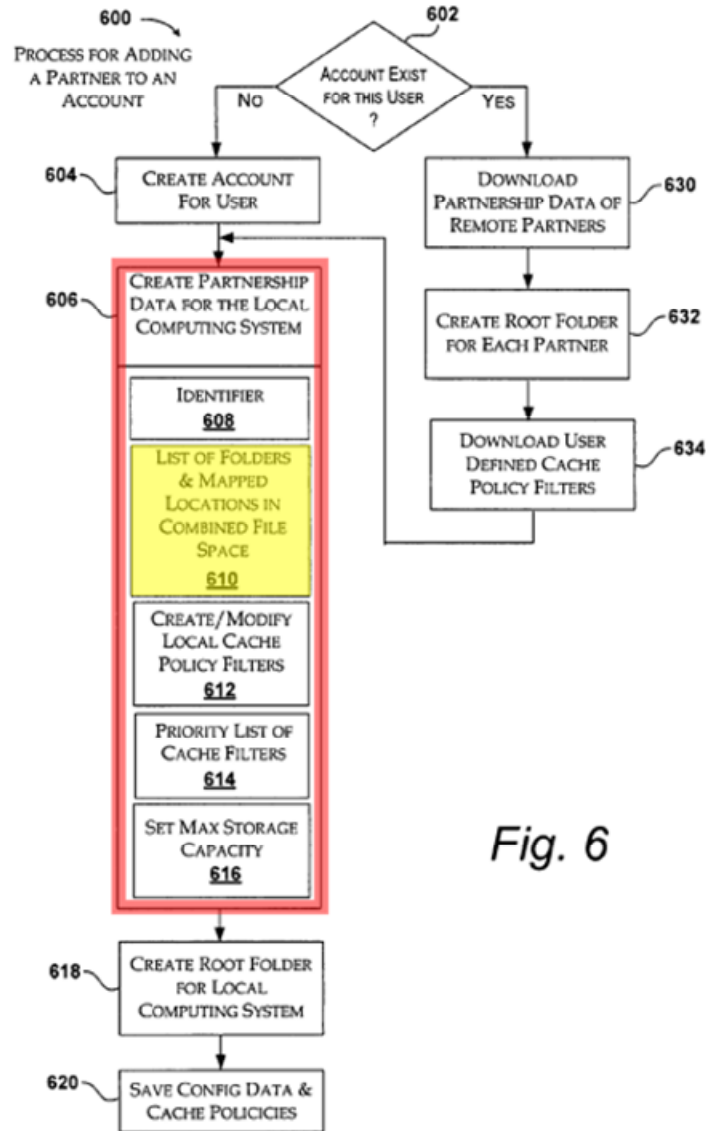


Fig. 6

Ex-1008, Fig.6. In other words, Tsang discloses that during registration of an individual device, selection of local folders is performed, such that the selected folders are shared in the combined file space, thereby adding the files within these selected folders to the combined file space. In the Aboulhosn-Phillips system, once these folders (and files contained therein) are selected to be added to the shared folder, these files are inventoried to generate a meta-index. *See* Section

IX.A.5 (1[D]); Ex-1003, ¶216.

Moreover, just like the '338 patent's categories of data (*i.e.*, “documents...pictures...audio...video” (Ex-1001, 5:49-53)), Tsang discloses that “the list of **folders may [] include...‘Documents’, ‘Music’, ‘Pictures’, and ‘Videos’**” (Ex-1008, 7:18-21). Because these folders correspond to different **categories** of data, a PHOSITA would have understood that by selecting “Documents” folder, the selection is of a category of documents, by selecting “Music” folder, the selection is of a category of music, and so forth. Ex-1003, ¶217.

Claim 3 does not specify who performs the “selection of categories of data.” The '338 patent specification states that the selection may be performed either **by the user manually or by the member device automatically**. Ex-1001, 5:46-56 (stating that, in one embodiment “**the user...selects** the type or category of data,” and in another “embodiment, all categories are **automatically selected**”). Both possibilities are disclosed by Tsang. Ex-1003, ¶218.

Tsang Discloses Manual Selection. Specifically, Tsang discloses that “[a]t block 606 [red]...a user interface element may be displayed for inputting the partnership data.” Ex-1008, 7:7-10.

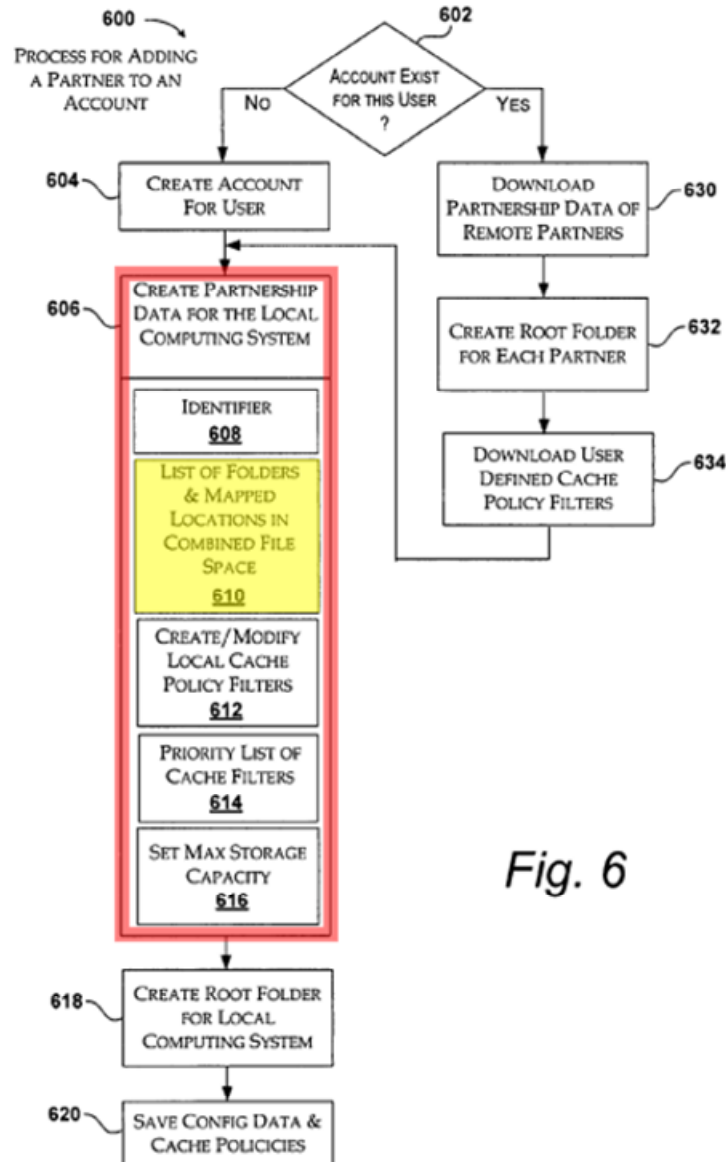


Fig. 6

Ex-1008, Fig.6. Therefore, a PHOSITA would have understood that the user interface may also be used for the user to select a list of folders at block 610 (yellow), which is part of the partnership data creation process 606 (red). In other words, Tsang discloses selecting categories of data by the user manually. Ex-1003, ¶219.

Tsang Discloses Automatic Selection. On the other hand, like the '338 patent, Tsang discloses that “[b]y default, the list of folders may **automatically include known folders** that exist on the partner computing device. For example, “Documents”, “Music”, “Pictures”, and “Videos” may be **automatically mapped** into the combined file space.” Ex-1008, 7:16-20. Thus, Tsang also discloses selecting categories of data by an individual device automatically. Ex-1003, ¶220.

Therefore, Aboulhosn-Phillips in view of Tsang discloses that “**registration of the multiple devices includes selection of categories of data** [*e.g.*, Tsang’s selection of folders, such as “Documents”, “Music”, “Pictures”, and “Videos”] **for each of the multiple devices to be inventoried**” required by claim 3. Ex-1003, ¶221.

B. Claim 4

Claim 4 depends from independent claim 3, which is rendered obvious by Aboulhosn-Phillips-Tsang. *See* Section X.A. Claim 4 further recites “**wherein categories of data include documents, videos, pictures and music,**” which is disclosed by Tsang for the same reasons explained in Section X.A (claim 3). Ex-1003, ¶222.

C. Motivation to Combine Aboulhosn-Phillips with Tsang

Tsang, Aboulhosn, and Phillips qualify as **analogous art** at least because they are in the **same field of endeavor** as the '338 patent, *i.e.*, file sharing and

synchronization. Like Aboulhosn, Phillips, and the '338 patent, Tsang is in CPC class G06F and U.S. class 707. Tsang similarly discloses a “a combined file space for files from multiple partner computing devices” (Ex-1008, Abstract), and a user is able to view “ghosted files” that “do not have content of the file stored in the local combined file space, but rather have metadata associated with the file” (*id.*, 3:50-53). Ex-1003, ¶223.

Like Aboulhosn, Phillips, and the '338 patent, Tsang discloses registering devices to a combined file space. Ex-1008, Abstract; Ex-1001, 5:43-46; Ex-1005, Fig.8; Ex-1006, Figs. 5, 6A-6B. While Aboulhosn does not disclose selecting categories of data when registering a device, a PHOSITA would have been motivated to incorporate Tsang’s folder (category) selection process as part of device registration such that a user registering a device is given an opportunity to select the data he/she wants to share at the initial setup stage. As described in all references and the '338 patent, a user registers a new device to the shared group not only to view files from other devices but also to share files with other devices. Thus, by providing the user an opportunity to select the data to share when registering the device, the user needs not wait until device registration is complete to upload such data. Instead, the data may be uploaded automatically upon completing device registration, thereby consuming fewer computer resources, saving unnecessary user operations, and improving user experience. Moreover,

like Aboulhosn, Tsang discloses that “[i]n order to provide the same view of the shared files in a combined file space with limited space, the combined file space may include a ‘ghosted file’...instead of actual content...for the associated file.” Ex-1008, 3:43-47. As a first step, Tsang teaches selecting categories of data (610, yellow) when initially setting up a device.

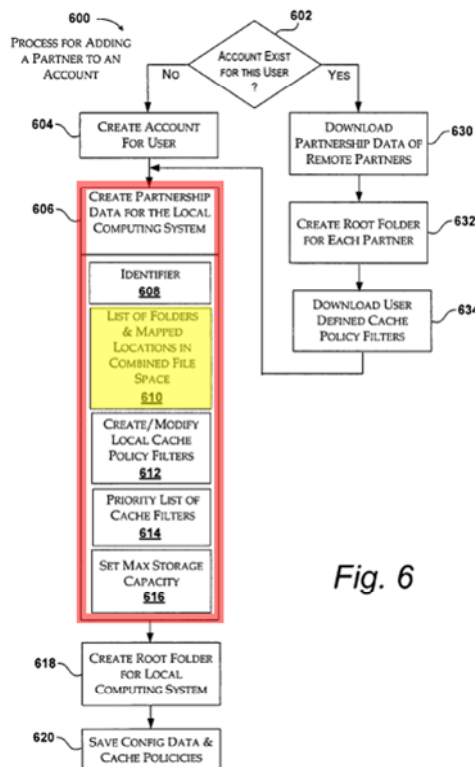


Fig. 6

Ex-1008, Fig.6. In particular, Tsang discloses applying and prioritizing cache policy filters to these categories of data to determine the file’s state (*e.g.*, ghosted, cached, master), as illustrated in Figure 5 below (music in yellow, documents in green, videos in blue). *Id.*, 5:66-67, 6:30-37, Fig.3; Ex-1003, ¶224.

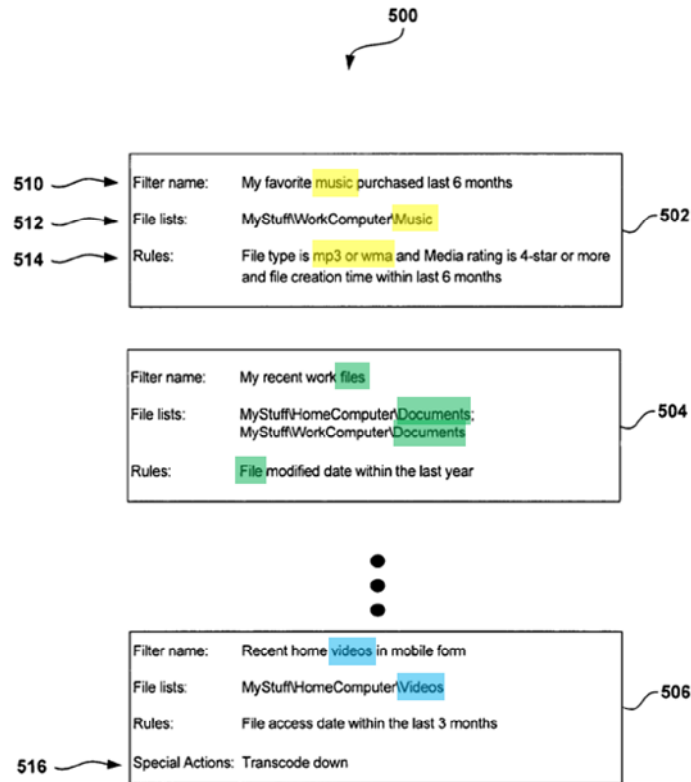


Fig. 5

Therefore, a PHOSITA implementing Aboulhosn's system would have been motivated to incorporate Tsang's data category selection feature to facilitate virtual/local file state determination and control, thereby enabling user access to the entire shared folder even on devices with limited space, as contemplated in both Aboulhosn and Tsang. Finally, by being able to select multiple folders (and thereby categories of data) to share, the user does not need to navigate among multiple folders to select individual files to add to Aboulhosn-Phillips's shared folder, which further reduces unnecessary and cumbersome user operations and improves user experience. Ex-1003, ¶225.

A PHOSITA would have had a **reasonable expectation of success** in incorporating Tsang's folder/data category selection as part of Aboulhosn-Phillips's device registration process. Tsang discloses two ways of selecting categories: through (1) a user interface, and (2) automatic selection of default folders or categories of data. Ex-1008, 7:9-11, 7:18-20. It was well known at the time of the '338 patent to utilize a user interface to select folders to share with other devices. *See, e.g.*, Ex-1023, Figs. 7-9. A PHOSITA would also have understood that selecting default folders/categories of data also involves simple and well-known modifications to Aboulhosn-Phillips's device registration process on a member device and would have resulted in a working system. Ex-1003, ¶226.

XI. GROUND 3: CLAIMS 1-2 AND 5-14 ARE OBVIOUS OVER ABLOUHOSN IN VIEW OF PHILLIPS AND SHAPPELL

A. Claims 1-2, 5, and 7-14

To the extent PO argues that Aboulhosn-Phillips does not explicitly disclose “modifying file systems” required by 1[J] and 7[G], Shappell discloses it. Ex-1003, ¶227.

Like Aboulhosn, Shappell discloses generating and displaying virtual files on a remote device. Ex-1007, ¶79 (disclosing “a display icon 1504 to denote a ‘missing’ file that is available on another system...is ghosted or semi-transparent.”); Ex-1003, ¶228.

Moreover, Shappell discloses that its “invention may be **implemented as a**

file system driver or filter driver that resides below the file system and accesses file system services provided by an operating system.” Ex-1007, ¶44. A PHOSITA would have understood that implementing “a file system driver or filter driver that resides below the file system and accesses file system services” means embedding a file system driver or filter driver between the file system and file system services to modify the way the file system would otherwise behave, *i.e.*, modifying the file system. This is consistent with a PHOSITA’s understanding of a file system driver or filter driver. Ex-1030, p.5; Ex-1003, ¶¶229-230.

Moreover, to the extent PO argues that Aboulhosn-Phillips does not explicitly disclose claim 7’s “software client plug-in,” Shappell discloses it. A PHOSITA would also have understood that Shappell’s file system filter driver is a software client plug-in because it plugs in between the member device’s existing file system and its file system services, modifying the way the file system would otherwise behave, *e.g.*, by intercepting requests targeted at a file system or another file system filter driver and extend or replace functionality provided by the original target of the request. Ex-1003, ¶¶231-232.

B. Motivation to Combine Aboulhosn-Phillips with Shappell

Shappell, Aboulhosn, and Phillips qualify as **analogous art** at least because they are in the **same field of endeavor** as the ’338 patent, *i.e.*, file sharing and synchronization. Like Aboulhosn, Phillips, and the ’338 patent, Shappell is in

CPC class G06F. Also like Aboulhosn, Phillips, and the '338 patent, Shappell discloses a “shared space” for multiple users (Ex-1007, Abstract), and a user is able to view files that are “on another system” and “not present locally.” *Id.*, ¶79; Ex-1003, ¶233.

A PHOSITA would have been motivated to combine Shappell with Aboulhosn-Phillips. As mentioned above, both the Aboulhosn-Phillips system and Shappell discloses file sharing and synchronization among multiple users and for files that are not local to an individual device, the files are displayed as “virtual files” (in Aboulhosn-Phillips) or “ghosted” (in Shappell). As explained above, both Aboulhosn and Phillips disclose to a PHOSITA which computer system layer to implement the Aboulhosn-Phillips system, *e.g.*, by modifying the conventional file system. *See* Section IX.A.11 (1[J]). However, to the extent they do not, a PHOSITA would have been motivated to look to references with similar systems, such as Shappell, for guidance as to the appropriate computer system layer in which the Aboulhosn-Phillips system should be implemented. Shappell states that an advantage of its system, including the way in which it is installed, is that files can be “managed quickly and effectively.” Ex-1007, ¶11. Therefore, a PHOSITA looking to make the Aboulhosn-Phillips system quicker and more effective would have been motivated to implement the system as a file system driver or filter driver as taught by Shappell. Ex-1003, ¶234.

A PHOSITA would have had a **reasonable expectation of success** in implementing the Aboulhosn-Phillips system as a file system driver or filter driver that resides below the file system as taught by Shappell. As discussed above, the Aboulhosn-Phillips system and Shappell's system are analogous and both have the capability to display and allow access to virtual/ghosted files that are stored remotely. Ex-1005, Abstract, Figs. 2-4; Ex-1007, Fig.15, ¶82. Therefore, a PHOSITA would have understood that Shappell's particular computer system layer, *e.g.*, "a file system driver or filter driver that resides below the file system," that is used to implement Shappell's system would have also been suitable for implementing Aboulhosn-Phillips's system and have resulted in a working system. Ex-1003, ¶235.

C. Claim 6

To the extent PO argues that Aboulhosn does not disclose metadata including "local path the file is stored in" required by claim 6, Shappell discloses it. Aboulhosn indicates that the metadata may include more information than enumerated—noting the "and so on." *Id.* Shappell discloses such other metadata fields, including, *e.g.*, "Path to file," "Name of file," "size of the file," and "modification time." Ex-1007, ¶78. Thus, it would have been obvious for a PHOSITA to include additional information, such as Shappell's "Path to file," in Aboulhosn's metadata. Moreover, Aboulhosn discloses that "when a member

accesses a virtual file,...the file owner retrieves the data of the file and sends the data to the accessing member.” Ex-1005, 7:16-24. Therefore, a PHOSITA looking to make Aboulhosn’s system quicker and more effective—as taught by Shappell (Ex-1007, ¶11)—would have been motivated to incorporate Shappell’s file path in the metadata to enable faster and more accurate data retrieval. Indeed, it was common practice to include local file paths in the metadata. *See* Section IX.E. Adding additional information to metadata was a simple and well-known operation in file system implementations and would have resulted in a working system. Ex-1003, ¶236.

XII. GROUND 4: CLAIMS 3-4 ARE OBVIOUS OVER ABOULHOSN IN VIEW OF PHILLIPS, TSANG AND SHAPPELL

As explained in Section X (Ground 2), Aboulhosn in view of Phillips and Tsang discloses claims 3 and 4. A PHOSITA looking to implement the Aboulhosn-Phillips-Tsang system and wishing to do so in a manner that enables quick and effective file management and retrieval would have been motivated to look to a reference, such as Shappell, which discloses that its system enables files to be “managed quickly and effectively.” Ex-1007, ¶11. A PHOSITA would have therefore been motivated to implement the Aboulhosn-Phillips-Tsang system in the same or similar way as disclosed by Shappell—*i.e.*, as a file system driver or filter driver, as explained above in Section XI.B. Ex-1003, ¶¶237-238.

XIII. CONCLUSION

Trial should be instituted and the Challenged Claims cancelled as unpatentable.

Dated: December 12, 2023

Respectfully Submitted,

/Dion M. Bregman/

Dion M. Bregman, Reg. No. 45,645

CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Petition includes 13,794 words as counted by Microsoft Word and is therefore in compliance with the 14,000-word limit established by 37 C.F.R. 42.24(a)(1)(i). Accordingly, pursuant to 37 C.F.R. 42.24(d), lead counsel for the Petitioner hereby certifies that this Petition complies with the type-volume limits established for a petition requesting IPR.

Dated: December 12, 2023

Respectfully Submitted,

/Dion M. Bregman/

Dion M. Bregman, Reg. No. 45,645

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. 42.6(e)(4) and 42.105, lead counsel for Petitioner hereby certifies that on December 12, 2023, copies of this Petition and all supporting exhibits were sent via Priority Mail Express to the correspondence address of record for the '338 patent:

Schwegman Lundberg & Woessner, P.A.
P.O. Box 2938
Minneapolis, MN 55402

Courtesy copies have also been delivered electronically to counsel of record in the parallel District Court proceeding:

Skiermont Derby LLP
Alexander Gasser
agasser@skiermontderby.com
Jaime Olin
jolin@skiermontderby.com
John Lord
jlord@skiermontderby.com
Ryan Hargrave
rhargrave@skiermontderby.com
Paul Skiermont
pskiermont@skiermontderby.com

Dated: December 12, 2023

Respectfully Submitted,

/Dion M. Bregman/

Dion M. Bregman, Reg. No. 45,645

Appendix A

U.S. PATENT NO. 8,296,338 – Claim Listing

Claims 1 and 2	Claim 7	Claim 10
–	–	10[P]: A non-transitory computer-readable storage medium storing a set of instructions that, when executed by a processor, cause the processor to perform operations, comprising:
1[P]: A process for establishing a singular file system across multiple devices comprising:	7[P]: A system for establishing a singular file system across multiple devices comprising:	–
–	7[A]: a web-accessible server;	–
–	7[B]: at least one software client plug-in;	–
–	7[C]: multiple devices for storing and operating on files;	–
1[A]: receiving user information to open an account for establishing a singular file system across multiple devices via a web-based system that includes at least one server;	7[D][1]: the web-accessible server receives user information to open an account for establishing a singular file system across multiple devices,	10[A]: registering multiple devices with an account for establishing a singular file system across the multiple devices;
1[B]: installing an individual software client on each of the multiple devices via the web-based system;	7[D][2]: installs the at least one software plug-in on each of the multiple devices,	–
1[C]: accepting registration of multiple devices via the web-based system;	7[D][3]: accepts registration of the multiple devices,	10[A]: registering multiple devices with an account for establishing a

		singular file system across the multiple devices;
1[D]: scanning each of the multiple devices by each of the individual software clients to inventory data on each of the multiple devices and create a meta-index of the files for the inventoried data;	7[E][1]: further wherein the at least one software client plug-in scans its respective one of the multiple devices to inventory files thereon, creates a meta-index to files for the inventoried data,	10[B]: scanning each of the multiple devices to inventory data on each of the multiple devices and create a meta-index of the files for the inventory data;
1[E]: providing by the individual software clients via the multiple devices individual meta-indices of the inventoried data for each of the multiple devices to the at least one server;	7[E][2]: provides the meta-index of the inventoried data for its respective one of the multiple devices to the web-accessible server;	—
	7[F][1]: further wherein the web-accessible server receives meta-indices from each of the multiple devices and	—
1[F]: integrating by the at least one server the individual meta-indices to create a single master meta-index ;	7[F][2]: integrates the meta-indices to create a single meta-index ,	10[C]: generating a single master meta-index from meta-indices of files corresponding to inventory data on each of the multiple devices;
1[G]: providing by the at least one server the single master meta-index and meta-indices for each of the other multiple devices to each of the multiple devices via the individual software clients;	7[F][3]: provides the single meta-index and meta-indices for each of the other multiple devices to each of the multiple devices via the individual software clients,	10[D]: providing the single master meta-index and meta-indices for each of the other multiple devices to each of the multiple devices, metadata from the meta-indices of each of the other multiple devices to be integrated into a local file system of each of the multiple devices to generate virtual
1[H]: integrating metadata from the meta-indices of each of the other multiple devices into a local file	7[F][4]: integrates at each of the multiple devices metadata from the meta-indices of each of the other	

system of each of the multiple devices to generate virtual files stored in the same locations as local files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices; and	multiple devices into a local file system of each of the multiple devices to generate virtual files stored in the same locations as local files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices, and	files stored in the same locations as local files of the local file system, the virtual files indistinguishable from the local files by the local file system at each of the multiple devices; and
1[I]: continually updating the single master meta-index on the at least one server and each of the multiple devices in response to changes to the data indexed thereon,	7[F][5]: continually updates the single meta-index on each of the multiple devices in response to operations on the files indexed thereon,	—
1[J]: wherein the individual software clients facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index by modifying file systems of each of the multiple devices to include virtual files for data from the single meta-data index that is not local to a multiple device.	7[G]: wherein the individual software clients facilitate storage of the data within each of the multiple devices in accordance with the single meta-data index by modifying file systems of each of the multiple devices to include virtual files for data from the single meta-data index that is not local to a multiple device.	10[E]: facilitating storage of data within each of the multiple devices in accordance with the single master meta-index by modifying file systems of each of the multiple devices to include virtual files for data from the single master meta-data index that is not local to a multiple device.
2: The process according to claim 1 wherein the individual software clients vary according to the individual operating systems of each of the multiple devices.	7[D][4]: wherein the at least one software plug-in varies in accordance with an operating system of each of the multiple devices;	—

No.	Dependent Claim Elements
Claim 3	3. The process according to claim 1 wherein registration of the multiple devices includes selection of categories of data for each of the multiple devices to be inventoried.
Claim 4	4. The process according to claim 3 wherein categories of data include documents, videos, pictures and music.
Claim 5	5. The process according to claim 1, wherein the individual software clients facilitate creation of a visual representation of the virtual files on a remote one of each of the multiple devices that is indistinguishable from a visual representation of an actual file that is located on a local one of the multiple devices.
Claim 6	6. The process according to claim 1, wherein the meta-data includes at least information regarding file name, file type, file size, local path the file is stored in, date created, and date modified.
Claim 8	8. The system according to claim 7, wherein the at least one software client plug-in facilitates storage of the files within its respective one of the multiple devices in accordance with the meta-data by modifying a file system of its respective one of the multiple devices to include virtual files for files from the single meta-index that are not local to the multiple device.
Claim 9	9. The process according to claim 8, wherein the at least one software client plug-in facilitates creation of a visual representation of the virtual files on its respective one of the multiple devices that is indistinguishable from a visual representation of an actual file that is physically located on a another of the multiple devices.
Claim 11	11. The non-transitory computer-readable storage medium of claim 10, further comprising: continually updating the single master meta-index on each of the multiple devices in response to changes to the data indexed thereon.
Claim 12	12. The non-transitory computer-readable storage medium of claim 10, further comprising: updating the single master meta-index on each of the multiple devices in response to changes to meta-indices of a local file of one of the multiple devices.
Claim 13	13. The non-transitory computer-readable storage medium of claim 10, further comprising:

	updating the single master meta-index on each of the multiple devices in response to changes to a local file of a first device, the local file corresponding to a virtual file of a second device, the local file system of the second device retrieving the local file from the first device.
Claim 14	14. The non-transitory computer-readable storage medium of claim 13, wherein the virtual files and the local files in the first device are indistinguishable by the local file system of the first device.