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(54) **METHOD FOR DISPLAYING FILES FROM A PLURALITY OF DEVICES IN A MULTI-VIEW INTERFACE AND FOR ENABLING OPERATIONS TO BE PERFORMED ON SUCH FILES THROUGH SUCH INTERFACE**

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G06F 11/07 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 11/07*** (2013.01)

(58) **Field of Classification Search**
USPC 715/717, 718, 734
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,862,346	A	1/1999	Kley et al.	
6,348,932	B1 *	2/2002	Nishikawa et al.	715/719
6,407,750	B1 *	6/2002	Gioscia et al.	715/716
6,636,873	B1	10/2003	Carini et al.	
6,636,888	B1	10/2003	Bookspan et al.	
6,904,185	B1	6/2005	Wilkins et al.	
7,039,723	B2	5/2006	Hu et al.	
7,103,357	B2	9/2006	Kirani et al.	
7,139,555	B2	11/2006	Apfel	
7,319,536	B1	1/2008	Wilkins et al.	
7,321,919	B2	1/2008	Jacobs et al.	
7,369,161	B2	5/2008	Easwar et al.	
7,372,485	B1	5/2008	Bodnar et al.	
7,441,180	B1	10/2008	Kaczmarek et al.	
7,502,795	B1	3/2009	Svendsen et al.	
7,576,752	B1 *	8/2009	Benson et al.	345/619
7,680,067	B2	3/2010	Prasad et al.	
7,707,500	B2 *	4/2010	Martinez	715/717
7,747,596	B2 *	6/2010	Bigioi et al.	707/705
7,774,326	B2 *	8/2010	Arrouye et al.	707/705
7,809,682	B2	10/2010	Paterson et al.	
7,930,270	B2 *	4/2011	Tsang	707/610
8,181,114	B2 *	5/2012	Saka	715/748
8,321,374	B2	11/2012	Holt et al.	
2002/0003548	A1 *	1/2002	Krusche et al.	345/736
2002/0013852	A1	1/2002	Janik	
2002/0044159	A1	4/2002	Kuroiwa et al.	
2002/0059604	A1	5/2002	Papagan et al.	

(Continued)

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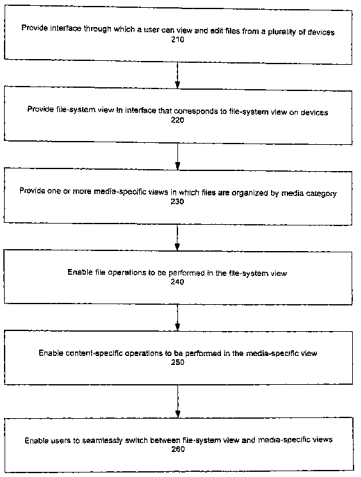
(57) **ABSTRACT**

In a synchronization or back-up system that synchronizes and/or back-ups files from multiple computing devices, the present invention provides a method for (1) displaying files from multiple computing devices in a multi-view user interface and (2) enabling content and file operations to be performed on such files through the user interface. The multi-view interface includes a file-system view and one or more media-specific views. In the file-system view files are organized in the same way in which they are organized on the devices on which they are stored. The file-system view in the interface looks essentially the same as the file-system view on client devices. In the file-system view, users can perform file operations on files. In the media-specific view files are organized by media category. In one embodiment of the media-specific view, files are organized by metadata that relates to the files content. In the media-specific view, users can perform content operations on the files.

24 Claims, 9 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2002/0065848	A1	5/2002	Walker et al.	
2002/0066050	A1	5/2002	Lerman et al.	
2002/0091697	A1*	7/2002	Huang et al.	707/10
2002/0099772	A1	7/2002	Deshpande et al.	
2002/0129096	A1	9/2002	Mansour et al.	
2003/0004952	A1	1/2003	Nixon et al.	
2003/0014478	A1	1/2003	Noble	
2003/0131098	A1	7/2003	Huntington et al.	
2003/0159136	A1	8/2003	Huang et al.	
2003/0218633	A1	11/2003	Mikhail et al.	
2004/0024979	A1	2/2004	Kaminsky et al.	
2004/0044732	A1	3/2004	Fushiki et al.	
2004/0088420	A1	5/2004	Allen et al.	
2004/0148207	A1	7/2004	Smith et al.	
2004/0148375	A1	7/2004	Levett et al.	
2005/0044164	A1	2/2005	O'Farrell et al.	
2005/0149213	A1*	7/2005	Guzak et al.	700/94
2005/0165869	A1	7/2005	Huang et al.	
2006/0052091	A1	3/2006	Onyon et al.	
2006/0156239	A1*	7/2006	Jobs et al.	715/727
2006/0242206	A1	10/2006	Brezak et al.	
2007/0005581	A1*	1/2007	Arrouye et al.	707/4
2007/0005707	A1*	1/2007	Teodosiu et al.	709/206
2007/0043830	A1	2/2007	Housenbold et al.	
2007/0156434	A1*	7/2007	Martin et al.	705/1
2007/0179989	A1	8/2007	Maes	
2007/0180075	A1	8/2007	Chasman et al.	
2007/0209005	A1*	9/2007	Shaver et al.	715/733
2007/0250645	A1	10/2007	Meadows et al.	
2007/0276836	A1	11/2007	Chatterjee et al.	
2008/0109448	A1	5/2008	Aboel-Nil et al.	
2008/0126936	A1*	5/2008	Williams	715/717
2008/0168185	A1*	7/2008	Robbin et al.	709/248
2008/0208870	A1*	8/2008	Tsang	707/10
2009/0094252	A1	4/2009	Wong et al.	
2009/0183060	A1*	7/2009	Heller et al.	715/202
2009/0187609	A1	7/2009	Barton et al.	
2010/0063670	A1	3/2010	Brzezinski et al.	

* cited by examiner

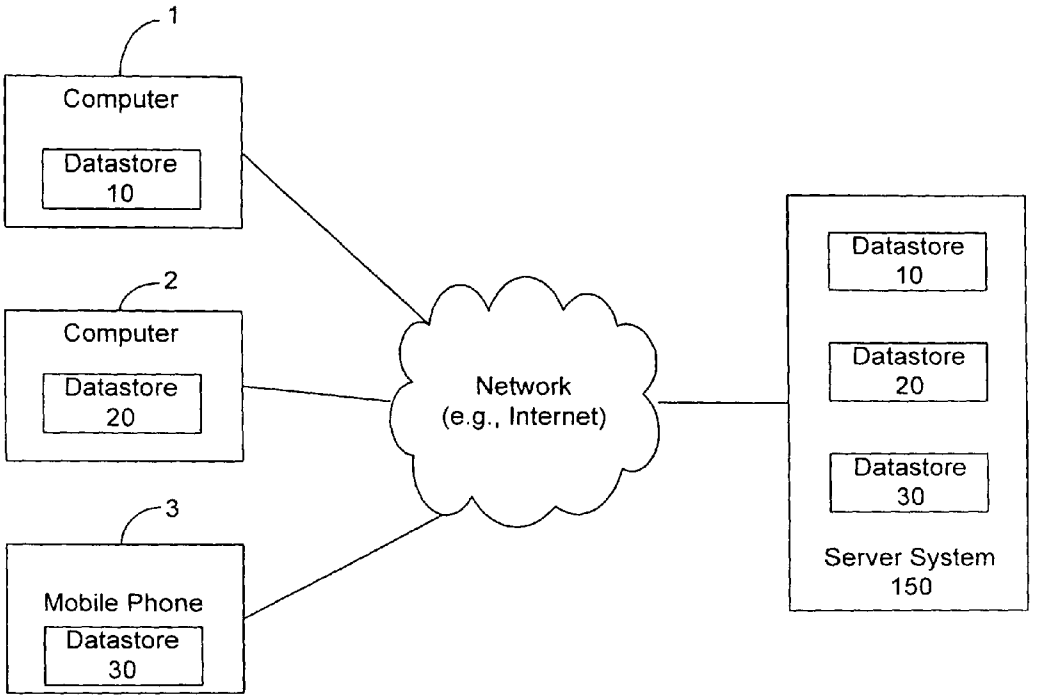

1
Computer
Datastore
10
2
Computer
Datastore
20
3
Mobile Phone
Datastore
30
Network
(e.g., Internet)
Datastore
10
Datastore
20
Datastore
30
Server System
150

Fig. 1

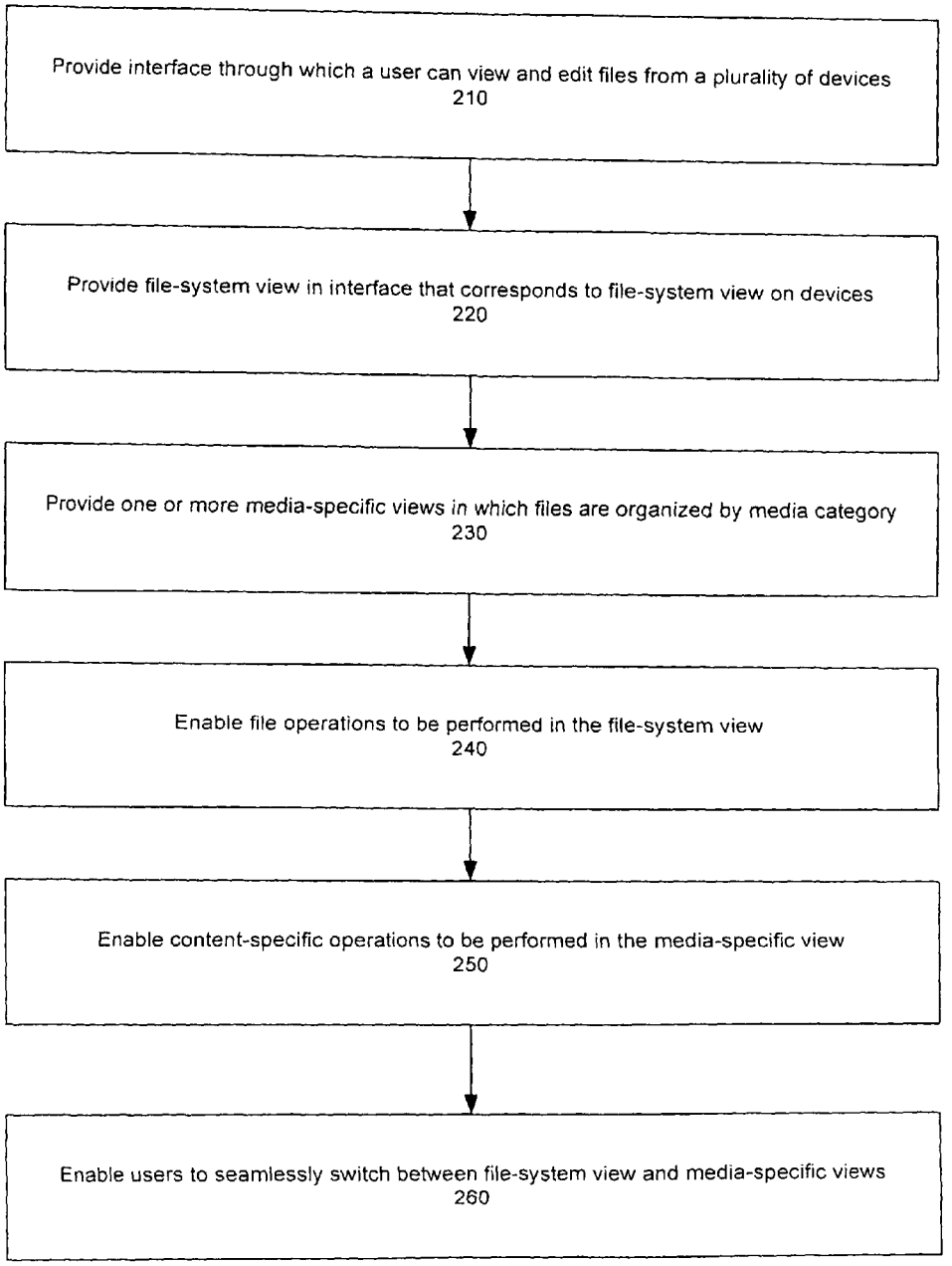

Provide interface through which a user can view and edit files from a plurality of devices
210
Provide file-system view in interface that corresponds to file-system view on devices
220
Provide one or more media-specific views in which files are organized by media category
230
Enable file operations to be performed in the file-system view
240
Enable content-specific operations to be performed in the media-specific view
250
Enable users to seamlessly switch between file-system view and media-specific views
260

Fig. 2

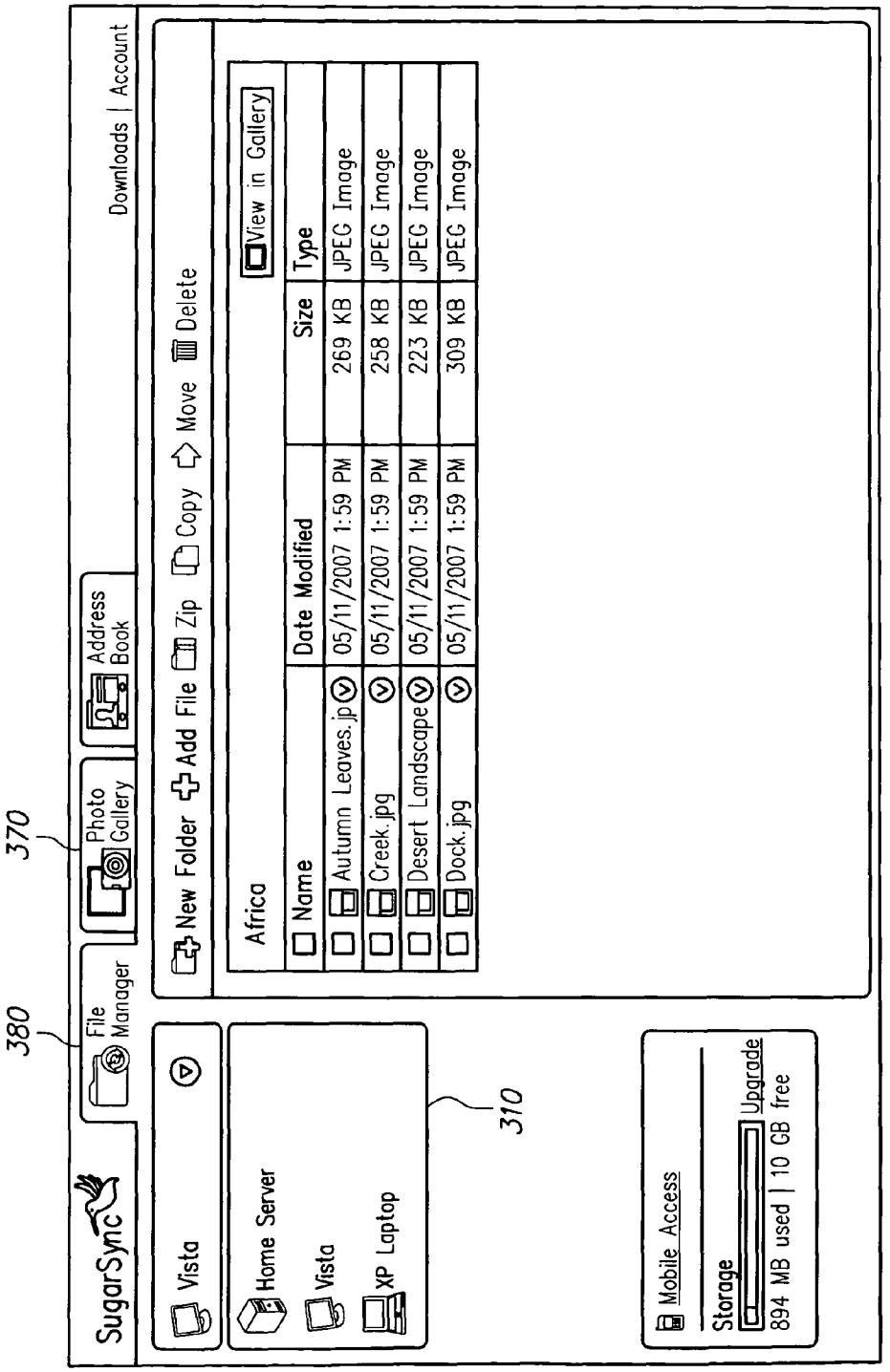

SugarSync
File Manager
Photo Gallery
Address Book
Downloads | Account
380
370
Vista
Home Server
Vista
XP Laptop
310
Mobile Access
Storage
Upgrade
894 MB used | 10 GB free
New Folder
Add File
Zip
Copy
Move
Delete
Africa
View in Gallery
Name
Date Modified
Size
Type
Autumn Leaves.jp
05/11/2007 1:59 PM
269 KB
JPEG Image
Creek.jpg
05/11/2007 1:59 PM
258 KB
JPEG Image
Desert Landscape
05/11/2007 1:59 PM
223 KB
JPEG Image
Dock.jpg
05/11/2007 1:59 PM
309 KB
JPEG Image

FIG. 3A

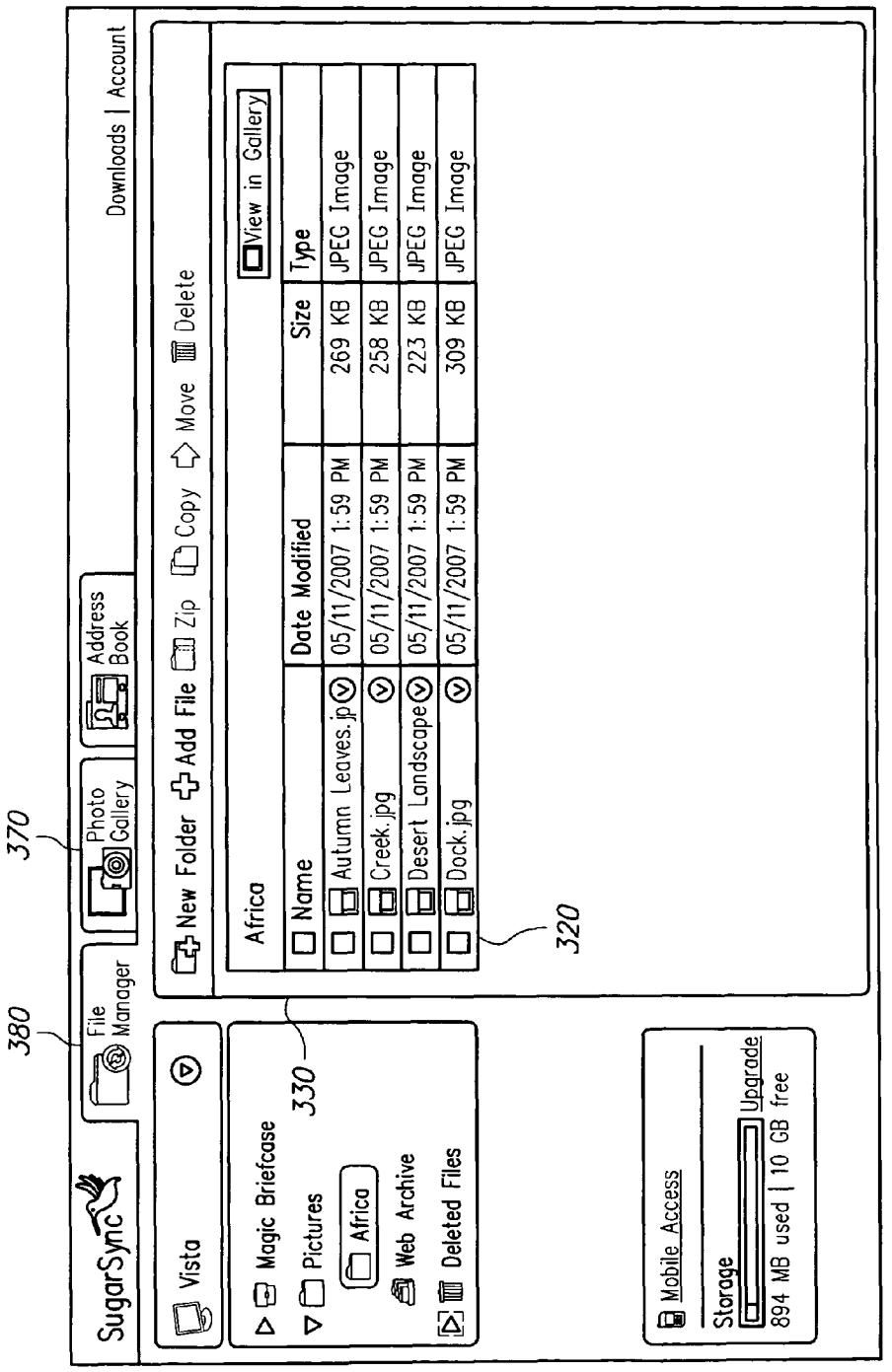

SugarSync
File Manager
Photo Gallery
Address Book
Downloads | Account
Vista
Magic Briefcase
Pictures
Africa
Web Archive
Deleted Files
Mobile Access
Storage
Upgrade
894 MB used | 10 GB free
New Folder
Add File
Zip
Copy
Move
Delete
Africa
View in Gallery
Name
Date Modified
Size
Type
Autumn Leaves.jp
05/11/2007 1:59 PM
269 KB
JPEG Image
Creek.jpg
05/11/2007 1:59 PM
258 KB
JPEG Image
Desert Landscape
05/11/2007 1:59 PM
223 KB
JPEG Image
Dock.jpg
05/11/2007 1:59 PM
309 KB
JPEG Image
370
380
330
320

FIG. 3B

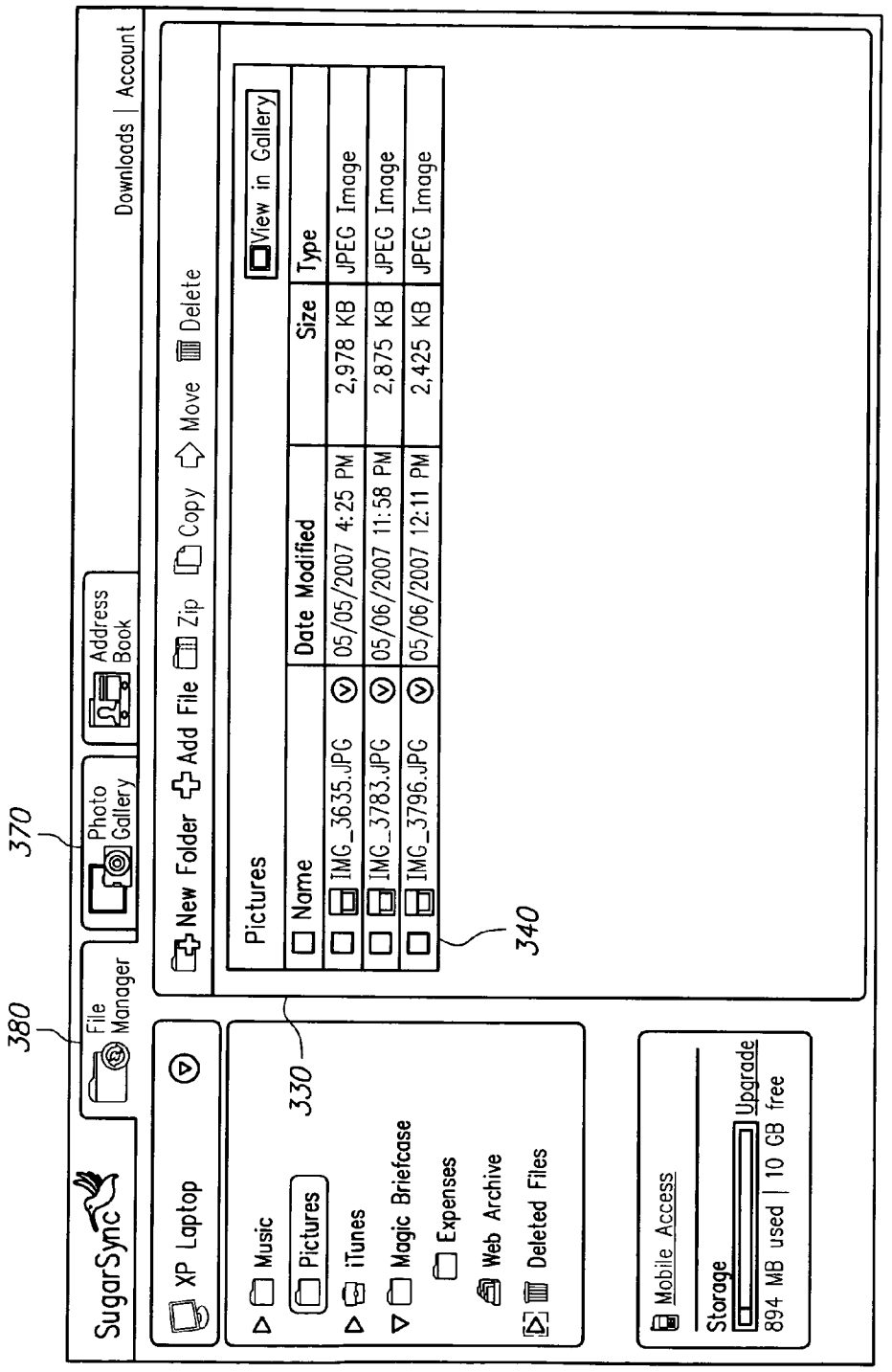

SugarSync
File Manager
380
Photo Gallery
370
Address Book
Downloads | Account
XP Laptop
Music
Pictures
330
iTunes
Magic Briefcase
Expenses
Web Archive
Deleted Files
Mobile Access
Storage
Upgrade
894 MB used | 10 GB free
New Folder
Add File
Zip
Copy
Move
Delete
Pictures
View in Gallery
Name
Date Modified
Size
Type
IMG_3635.JPG
05/05/2007 4:25 PM
2,978 KB
JPEG Image
IMG_3783.JPG
05/06/2007 11:58 PM
2,875 KB
JPEG Image
IMG_3796.JPG
05/06/2007 12:11 PM
2,425 KB
JPEG Image
340

FIG. 3C

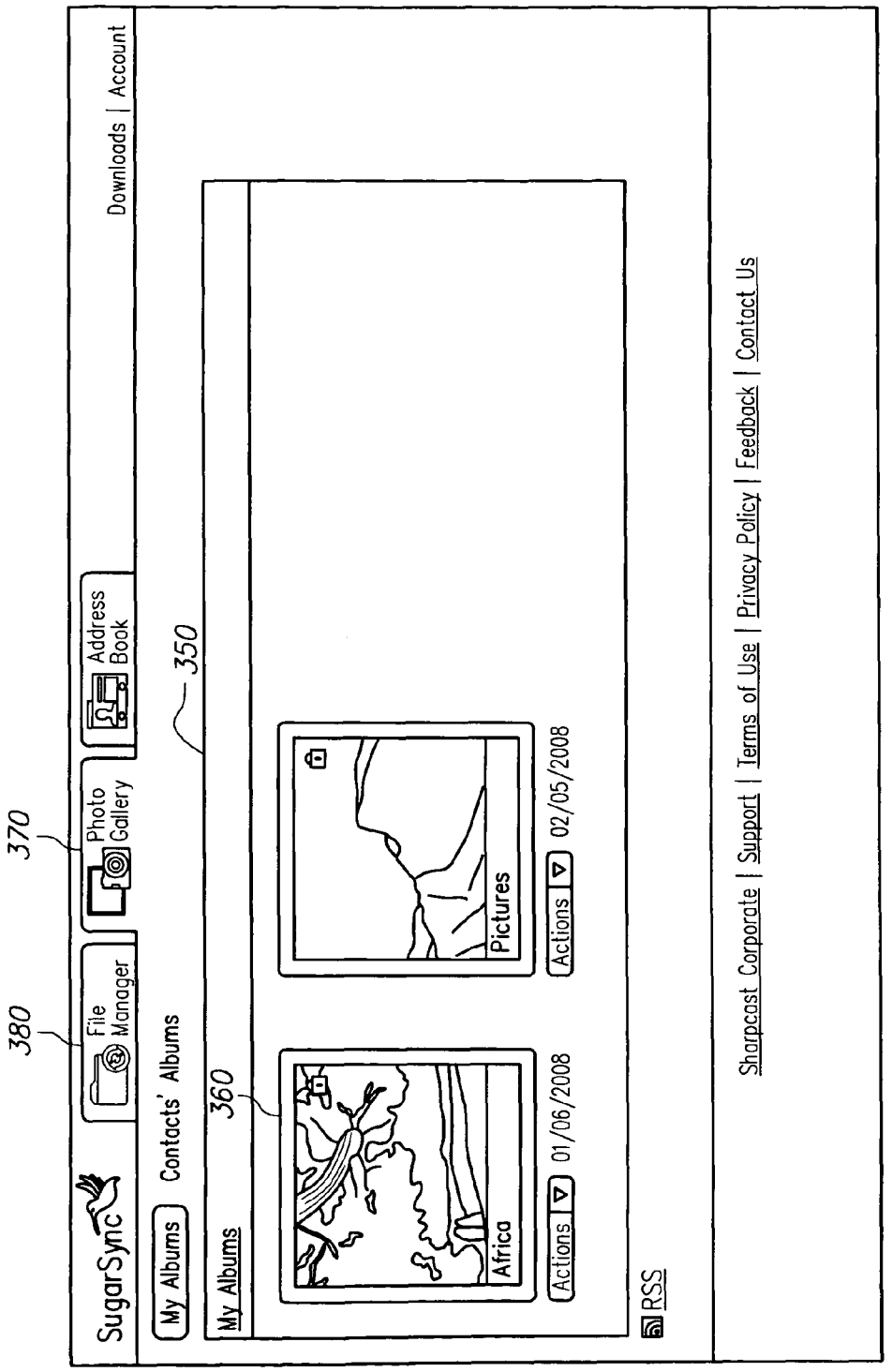

SugarSync
File Manager
Photo Gallery
Address Book
Downloads | Account
380
370
350
360
My Albums
Contacts' Albums
My Albums
Africa
Actions
01/06/2008
Pictures
Actions
02/05/2008
RSS
Sharpcast Corporate | Support | Terms of Use | Privacy Policy | Feedback | Contact Us

FIG. 3D

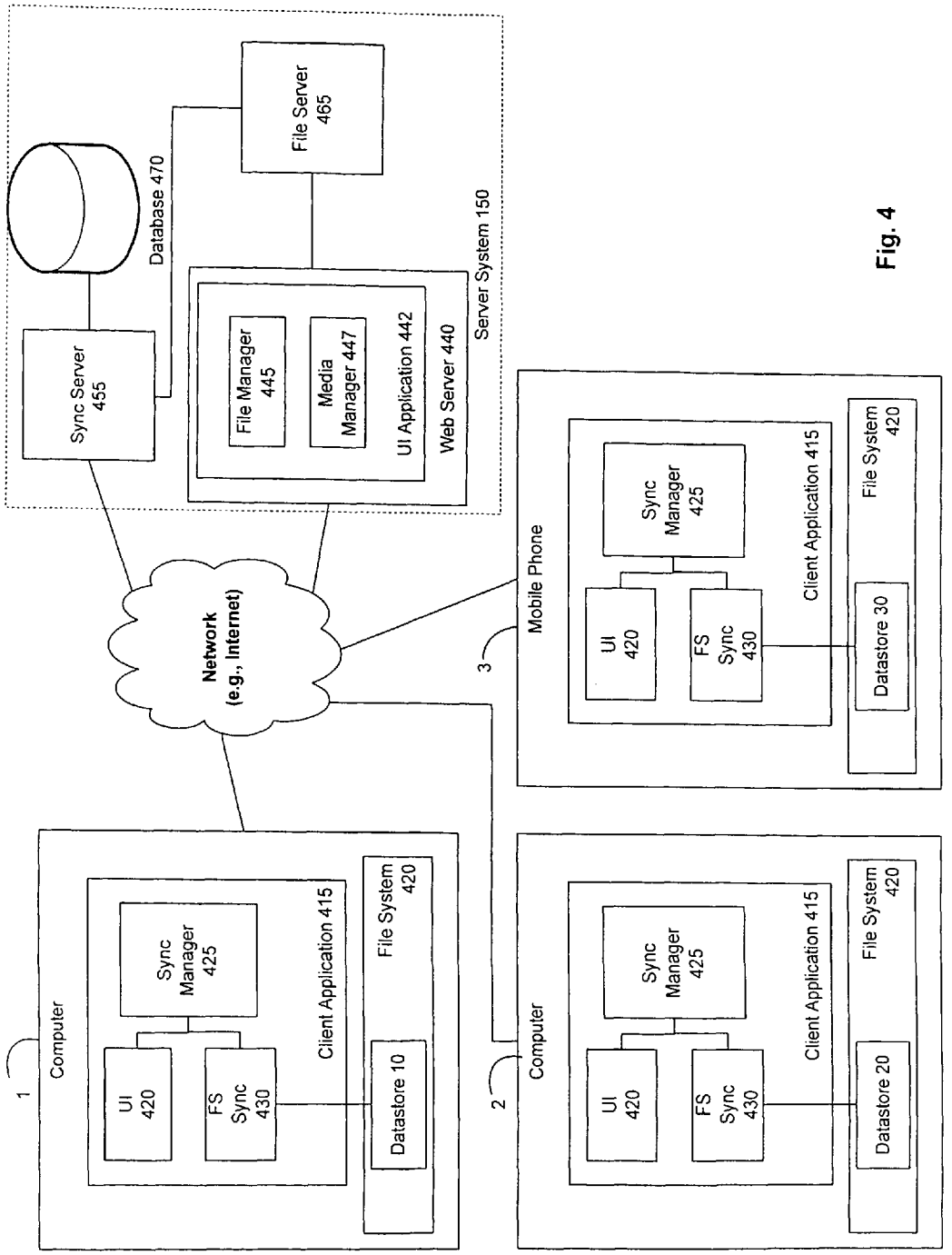

Sync Server
455
Database 470
File Server
465
File Manager
445
Media
Manager 447
UI Application 442
Web Server 440
Server System 150
Network
(e.g., Internet)
Mobile Phone
3
Sync
Manager
425
UI
420
FS
Sync
430
Client Application 415
File System
420
Datastore 30
Computer
1
Datastore 10
Computer
2
Datastore 20

Fig. 4

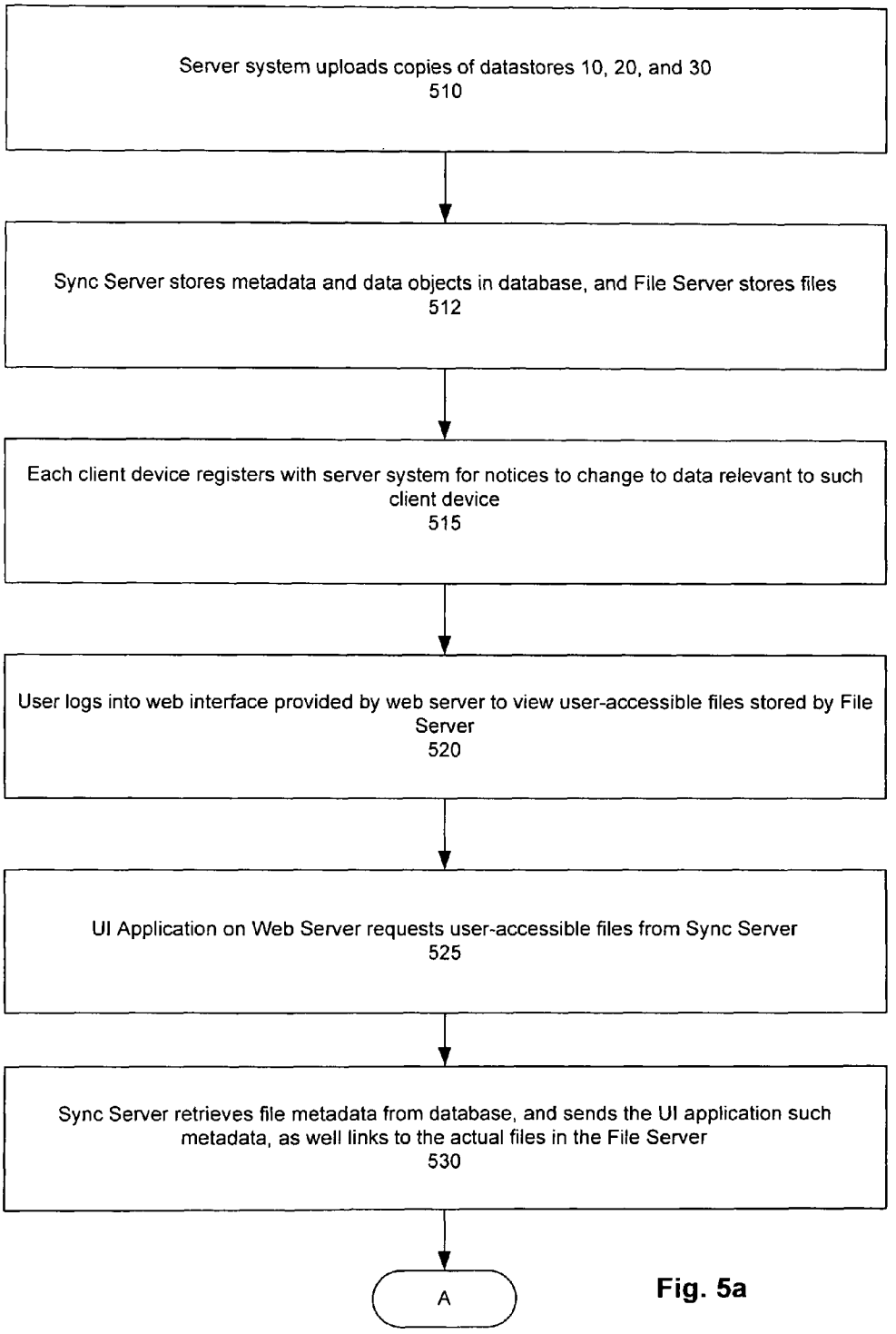
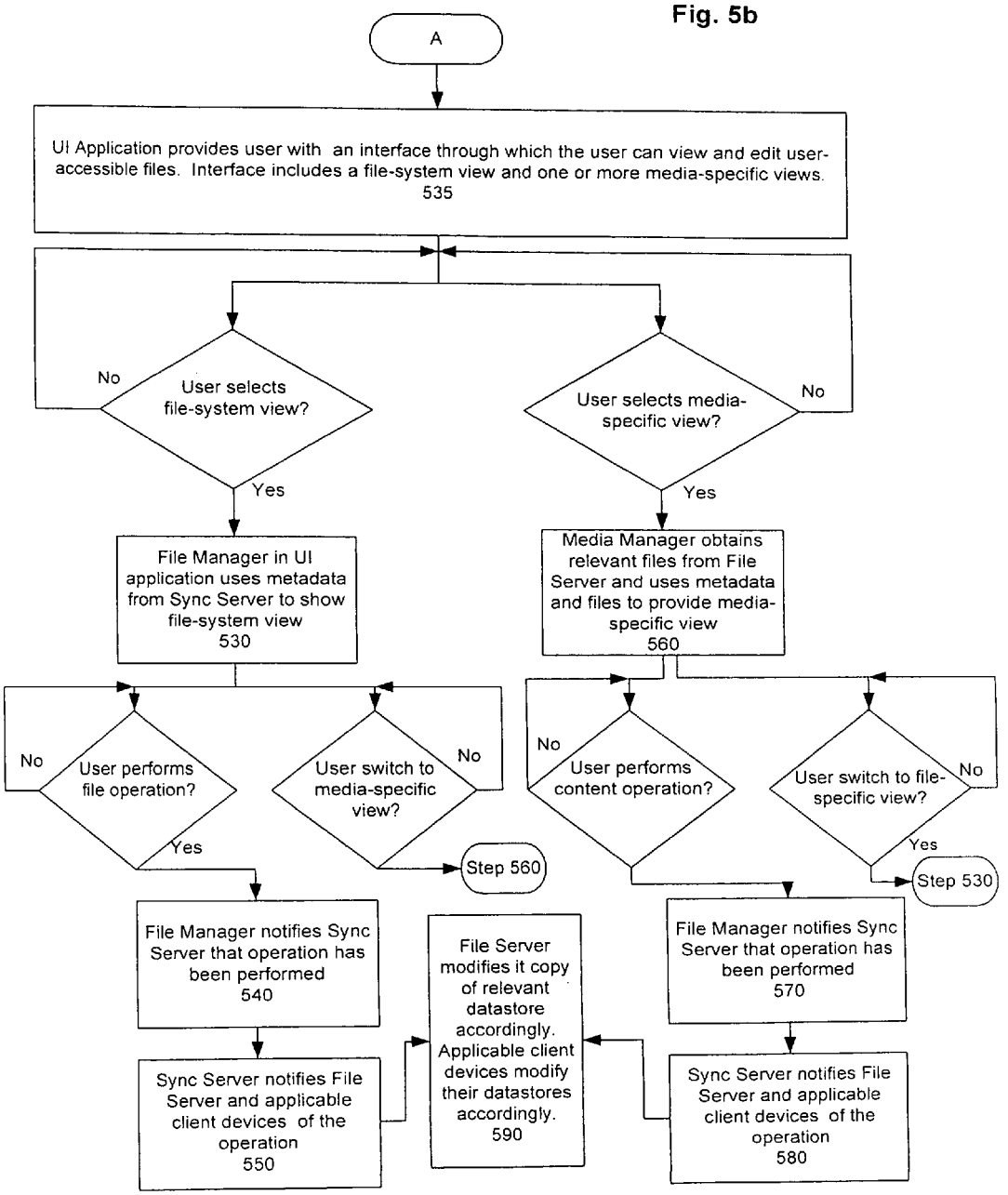

Server system uploads copies of datastores 10, 20, and 30
510
Sync Server stores metadata and data objects in database, and File Server stores files
512
Each client device registers with server system for notices to change to data relevant to such client device
515
User logs into web interface provided by web server to view user-accessible files stored by File Server
520
UI Application on Web Server requests user-accessible files from Sync Server
525
Sync Server retrieves file metadata from database, and sends the UI application such metadata, as well links to the actual files in the File Server
530
A

Fig. 5a

Fig. 5b


A
UI Application provides user with an interface through which the user can view and edit user-accessible files. Interface includes a file-system view and one or more media-specific views.
535
User selects file-system view?
No
Yes
User selects media-specific view?
No
Yes
File Manager in UI application uses metadata from Sync Server to show file-system view
530
Media Manager obtains relevant files from File Server and uses metadata and files to provide media-specific view
560
User performs file operation?
No
Yes
User switch to media-specific view?
No
Step 560
User performs content operation?
No
User switch to file-specific view?
No
Yes
Step 530
File Manager notifies Sync Server that operation has been performed
540
File Server modifies it copy of relevant datastore accordingly. Applicable client devices modify their datastores accordingly.
590
File Manager notifies Sync Server that operation has been performed
570
Sync Server notifies File Server and applicable client devices of the operation
550
Sync Server notifies File Server and applicable client devices of the operation
580

METHOD FOR DISPLAYING FILES FROM A PLURALITY OF DEVICES IN A MULTI-VIEW INTERFACE AND FOR ENABLING OPERATIONS TO BE PERFORMED ON SUCH FILES THROUGH SUCH INTERFACE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to synchronization/back-up server systems, and more, specifically, to a method for displaying files and data objects from a plurality of devices in such system.

2. Description of the Background Art

Back-up systems typically enable users to back up files from a plurality of computers to a central server. Some systems provide an interface through which users can view and access files from the computers backed up by the server. Such systems provide a file-system view of files for each computer. Although it is useful to have a file-system view for each computer, such a view does not enable a user to see a view of files across computers. Consequently, it is desirable to have an improved user interface that has multiple views of the backed-up files, where one or more views combines files from different computers. Also, it is desirable to any able to control any of the files on any of the devices through such improved interface.

SUMMARY

In a synchronization or back-up system that synchronizes and/or backs up files from multiple computing devices, the present invention provides a method for (1) displaying files from multiple computing devices in a multi-view user interface and (2) enabling content and file operations to be performed on such files through the user interface.

In the invention, files from multiple computing devices are displayed in an interface that includes a "file-system view" and one or more "media-specific views." In the file-system view, files are organized in the same way in which they are organized on the devices on which they are stored. The file-system view in the interface looks essentially the same as the file-system view on client devices. In one embodiment, files are organized by the client device on which they are stored. For example, if a user is accessing files from both computer A and computer B, the file-system view will show which files are stored on computer A and which files are stored on computer B. In the file-system view, the user can perform file operations (e.g., delete, copy, paste, move, etc.) on the files.

In media-specific views, files are organized by media category. For examples, if a user is accessing files that are stored on computer A and B, the photo files from both computers are displayed in a "photo view," the word processing files from both computers are displayed in a "documents view," the music files from both computers are displayed in the "music view," and the video files from both computers are displayed in the "video view." In the preferred embodiment of the media-specific view, files are not organized by the computer on which they are stored. In one embodiment, they are organized in accordance with metadata related to the content of the files. For example, in a music view, files may organized by artist or album, regardless of the client computing device on which the files are stored. In a photo view, photos may be organized by album or event, regardless of the client computing device on which the photos are stored. In the media-specific view, users can perform content operations on the files.

A user can seamlessly move between the file-system view and the media-specific views. In a further embodiment of the invention, the user also can view data objects (such as email messages, calendar appointments, and contacts) through the interface. In such an embodiment, there can be a media-specific view for each type of data object.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram that illustrates an example of a synchronization/back-up system.

FIG. **2** is a flow chart that illustrates a method for displaying files in a multi-view interface and for enabling operations to be performed on files through such interface.

FIGS. **3***a*-**3***d* are screen shots that illustrate examples of a file-system view and a media-specific view.

FIG. **4** is a more detailed block diagram of a synchronization/back-up system that can implement the present invention.

FIG. **5** is a flowchart that shows one way in which the system of FIG. **4** can implement the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In a synchronization or back-up system that synchronizes and/or backs up files from multiple computing devices, the present invention provides a method for (1) displaying files from multiple computing devices in a multi-view user interface and (2) enabling content and file operations to be performed on such files through the user interface.

An example of a synchronization/back-up system is disclosed in U.S. patent application Ser. No. 11/269,498 titled "Method and Apparatus for a File Sharing and Synchronization System," and filed on Nov. 8, 2005 with first-named inventor Jack B. Strong, the contents of which are incorporated by reference as if fully disclosed herein. Another example is depicted in FIG. **4**.

FIG. **1** illustrates an example of a network that includes a synchronization/back-up system. In the illustrated system, a user can back up files to server system **150**. FIG. **1** shows three client computing devices, belonging to the same user, that are connected via a network (such as the Internet) to server system **150**. The client computing devices are computer **1** (e.g., a home computer), computer **2** (e.g., a work computer), and mobile phone **3**. Computer **1**, computer **2**, and mobile phone **3** include "datastores" **10**, **20**, and **30**, respectively, that a user has elected to back up to server system **150**. Those skilled in the art will appreciate that there are other type of computing devices, such as Personal Digital Assistants (PDAs) and set-top TV boxes, and this invention is in no way limited to files from the illustrated computing devices.

A "datastore" is the files, data objects, and corresponding metadata on a device that are backed up by the server system. Examples of metadata include the title of a file, the folder in which a file is stored, the date a file was created, etc. Datastore **10** includes the files and metadata backed up on computer **1**, datastore **20** includes files and metadata backed up on computer **2**, and datastore **30** includes the files and metadata backed up on mobile phone **3**.

A copy of datastores **10**, **20**, and **30** are uploaded to and stored by server system **150**. Server system **150** ensures that the copies of datastores **10**, **20**, and **30** stored by server system **150** are synchronized with the actual datastores **10**, **20**, and **30** on client devices **1**, **2**, and **3**. In one embodiment, server system **150** also synchronizes files across client devices **1**, **2**, and **3**.

The server system **150** provides an interface through which a user can access and view files stored by the server system **150**. FIG. **2**, discussed below, illustrates one way in which this interface may be provided. Since a user can back up files from multiple devices to database server system **150**, the interface provided by server system **150** enables users to remotely view and operate on files from multiple computing devices.

FIG. **2** illustrates a method for displaying files from multiple computing devices and for enabling content and file operations to be performed on such files. Such method may be implemented by a computer system, such as server system **150**, that has access to files from multiple client computing devices. For example purposes, this method will be described with respect to a server, but those skilled in the art will appreciate that a client device may be able to act like a server and access files from other networked computer devices.

Referring to FIG. **2**, the server (such as a web server **440** in FIG. **4**) provides an interface through which a user can view and edit files from a plurality of devices (step **210**). In one embodiment, the interface is a web interface displayed in a user's browser. However, in alternate embodiments, the interface could be provided by a client application running on a client device that has access to files from multiple devices.

Within the interface, the server provides a "file-system view" in which user-accessible files are organized in the same way as they are organized in the file systems of the devices on which such files are stored (step **220**). In one embodiment, there is a file-system view for each device. In such embodiment, the file-system view provided in the interface corresponds to the file-system view of the files on the device itself. In an alternate embodiment, files from multiple devices are combined into a single file-system view (i.e., the file system view need not be device-specific).

FIGS. **3***a*-**3***c* illustrate examples of a file-system view. In this example, there is a file-system view for each backed-up device. As shown in FIG. **3***a*, the example file-system view includes a menu **310** from which a user can select one of the user's client devices, named "Vista," "Home server," and "XP Laptop." By selecting a device in the drop-down menu **310**, the user can see the files backed-up to the server on such device. In the screen in FIG. **3***b*, the user has chosen to view the files on "Vista" and has selected the "Africa" sub-folder in the "Pictures" folder. Consequently, photo files **320** from the "Africa" folder are displayed in window **330**. In FIG. **3***c*, the user has chosen to view files from the device labeled "XP Laptop" and has selected the "Pictures" folder. Consequently, photo files **340** from the "Pictures" folder are displayed in window **330**.

Referring again to FIG. **2**, the server also provides one or more "media-specific views" in which files are organized by media category (step **230**). Each media-specific view corresponds to a media category. For example, all photos in backed-up datastores can be shown in the "photo view," all word-processing documents can be shown in a "documents view," all music files can be stored in a "music view," and all video files can be stored in a "video view."

FIG. **3***d* illustrates an example of a media-specific view for photos. In this example, all the backed-up photo files from the user's devices (Vista, XP Laptop, and work server) are displayed in a photo-specific view **350** called the "Photo Gallery." Each folder containing photos on a user's device is converted into a photo album in the Photo Gallery, where each photo album has the same name as the folder corresponding to such album. The photos from the "Africa" folder on the device labeled "Vista" are displayed in the photo album **360** titled "Africa." The photos from the "Pictures" folder on the device labeled "XP Laptop" are displayed in the photo album titled "Pictures." Although not displayed, there could also be media-specific views for other types of media, such as video files, music files, and word-processing documents. FIGS. **3***a*-**3***d* are just examples of one way to implement the interface of the present invention, and the invention is in no way limited to these examples.

In the preferred embodiment, files of the same media type from multiple devices are combined into a single media-specific view, where they are not necessarily organized by device. In one embodiment, files within a media-specific view are organized in accordance with metadata related to the content of the files in the view. For example, in a music view, files may organized by artist or album, regardless of the client computing device on which the files are stored. In a photo view, photos may be organized by album or event, regardless of the client computing device on which the photos are stored.

The server enables file operations to be performed on files in the file-system view (step **240**). Examples of file operations include deleting a file, copying a file, pasting a file, and moving a file. Such operations also can be performed on entire folders in the file system view (e.g., folders can be copied, deleted, pasted and moved). If a user performs a file operation (including operations on folders) in the file-system view, the operation is propagated to all client devices that have registered for notices of changes to the file (which is usually those systems that also store a copy of the file). For instance, in the example system in FIG. **1**, if the user, through a file-system view provided by server system **150**, deletes a file for which computer **1** has registered for notices, computer **1** is notified of the file operation and modifies its file system accordingly. The server system **150** also would modify its copy of datastore **10** in accordance with the file operation.

The server enables content-specific operations to be performed in the media-specific view (step **250**). If a user edits the content of a file through the media-specific view, the edits are propagated to the device(s) that have registered for notices related to the file (as stated above, this usually devices that also store a copy of the file). Content-specific operations include editing the content of a file. For example, in the photo view illustrated in FIG. **3***d*, the user can crop a photo and the changes to the photo will be propagated to the device(s) that have registered for notices of the change.

Users can seamlessly switch between the file-system view and the media-specific view (step **260**). In the example file-system view shown in FIGS. **3***a*-**3***c*, the user can select the "Photo Gallery" tab **370** to switch to the Photo Gallery. Similarly, from the Photo Gallery, the user can select the "File Manager" tab **380** to switch to the file-system view. In one embodiment, if the user is in the media-specific view and attempts to perform a file operation, the user is automatically switched to the file-system view.

In a further embodiment of the invention, the user also can view data objects (such as email messages, calendar appointments, and contacts) through the interface. In such an embodiment, there can be a media-specific view for each type of data object. Data objects may or may not be displayed in the file-system view.

FIG. **4** illustrates a more detailed example of the systems displayed in FIG. **1**. Each of the client devices **1**, **2**, **3** includes a client synchronization application **415** that monitors a datastore (**10**, **20**, **30**) in the file system **420** on the client device. As stated above, the datastore includes the files (and data objects, if applicable) that a user wishes to back up to server system **150** (and possibly synchronize with other client devices), as well as the corresponding metadata.

The client synchronization application **415** has a UI Module **420** that provides a user interface to the backed up/syn-

chronized files. Like the interface provided by server system **150**, this interface may have a file-system view and one or more media-specific views of the files on the client device. The client application **415** also has a File System Sync module **430** that monitors the datastore in the client device's file system **420** for changes. When a client device is online, the Sync Manager **425** on such device maintains a dedicated connection with server system **150** and immediately uploads any changes to the datastore to server system **150**. When online, the Sync Manager **425** register with the server system **150** for notices of network changes (i.e., changes made on the server or another client device) relevant to such client device, and receives any such notices from the server system **150**.

The server system **150** includes a Sync Server **455**, File Server **465**, Web Server **440**, and database **470**. File server **465** stores a copy of each backed-up datastore. The Sync Server **455** keeps track of which client devices **1**, **2**, and **3** have registered for which notices of changes to data in the backed-up datastores. Also, the Sync Server **455** stores the metadata associated with backed-up datastores stored by File Server **465** in database **470**.

Those skilled in the art will appreciate that the server system **150** can be scaled to include multiple sync servers and file servers that work together to perform the functionality described with respect to server system **150**.

Web server **440** provides a web interface to users that have access to files stored by server system **150**. The interface is provided by a UI application **442** that includes a File Manager **445** and a Media Manager **447**. These modules are described in more detail with respect to FIG. **5**.

FIG. **5** is a flow chart that shows one way in which the system of FIG. **4** can implement an embodiment of the present invention. FIGS. **4** and **5** are just examples, and the invention is not limited to such example implementations.

The server system **150** uploads copies of each of the datastores **10**, **20**, and **30** in the client devices (**510**). The Sync Server **455** stores the metadata and data objects in such datastores in database **470**, and File Server **465** stores the files in such datastore (step **512**).

When client devices are online, the Sync Manager **425** on each client device maintains a dedicated connection with the server system **150**. When online, each client device also registers with the sever system **150** for notices to changes to data relevant to such client device (**515**).

The user logs into the web interface provided by web server **440** to view user-accessible files stored by file server **465** (step **520**). In response, the UI Application **442** on web server **440** requests the user-accessible files from Sync Server **455** (step **525**). The Sync Server **455** retrieves metadata related to the user-accessible files from database **470** and sends the UI application **440** such metadata, as well as links to the actual files in the File Server **465** (**530**). The metadata includes information about how user-accessible files are organized in the file systems **420** of the client devices on which such files are stored.

The UI application **442** then provides the user with an interface through which to view and access the user-accessible files, where the interface includes a file-system view and one or more media-specific views (step **535**)

If the user selects the file-system view, the File Manager **445** in the UI application **442** uses the metadata from the Sync Server **455** to show the file-system view. As stated above, in the file-system view, files are organized in the same way as they are organized in the file systems on the device(s) on which they are stored. If the user performs a file operation from the file-system view, the File Manager **445** notifies the Sync Server that the operation has been performed (step **540**). The Sync Server **455** then notifies the File Server **465** and the client applications **415** that have registered for notices related to such file of the operation (step **550**). The File Server **465** modifies its copy of the relevant datastore(s) accordingly (step **590**). Similarly, the client applications **415** notified of the change modify their file systems accordingly.

If the user selects or switches to a media-specific view, the Media Manager obtains the relevant files (i.e., the files of the media chosen) from the File Server **465**. In the case of a media-specific view for data objects, the data objects may be stored in database **470** and retrieved by Sync Server **455**. The Media Manager then uses the metadata and the files (or data objects) to provide a media-specific view (step **560**). Users can access the content of files/data objects in the media-specific view.

If the user performs an operation on the content of a file in the media-specific view, the Media Manager notifies the Sync Server that the operation has been performed (step **570**). The Sync Server **455** then notifies the File Server **465** and the client applications **415** that have registered for notices related to such file of the operation (step **580**). The File Server modifies its copy of the relevant datastore(s) accordingly (step **590**). Similarly, the client applications **415** notified of the change modify their file systems accordingly.

In one embodiment, if the user desires to perform a file operation (e.g., copy, move, paste, cut) on a file in the media-specific view, the Media Manager notifies the File Manager, and the user is automatically switched to the file-system view.

As will be understood by those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. Accordingly, the above disclosure of the present invention is intended to be illustrative and not limiting of the invention.

The invention claimed is:

1. A method for displaying files from a plurality of devices in a multi-view interface and for enabling operations to be performed on such files through such interface, the method comprising:

providing an interface having a view window, wherein, within the view window, a user is able to view, at the user's discretion, either a media-specific view or one of a plurality of file-system views, wherein each file-system view corresponds to a local file-system view on a different one of the plurality of devices and files within each file-system view are organized in the same way as files are organized in the corresponding local file-system view, wherein the media-specific view is a compilation view of all files from the plurality of devices that are designated with a particular media category, and wherein a user may view and edit files on one or more devices corresponding to the selected view in the view window;

enabling a user to perform file operations in each of the file-system views in the interface, wherein file operations include deleting files from folders, copying files in folders, and pasting files to folders and wherein performing a file-system operation in a file-system view in the interface causes the file-system on the device to which the file-system view corresponds to be altered in accordance with the performed file-system operation and wherein the changes are also propagated to other devices having synchronized copies of the affected files;

enabling a user to perform content-specific operations to be performed in a media-specific view in the interface; and

enabling a user to switch between the file-system and media-specific views, and switching automatically from

the media-specific view to the file-system view responsive to a file system operation performed in the media-specific view.

2. The method of claim **1**, wherein the interface is a web interface.

3. The method of claim **1**, wherein the media-specific view is one of the following: a photo view in which photo files are displayed, a music view in which music files are displayed, a video view in which video files are displayed, and a document view in which document files are displayed.

4. The method of claim **1**, wherein a user also can view and edit data objects through the interface and the media-specific view corresponds to a type of data object.

5. The method of claim **4**, wherein data objects include email messages.

6. The method of claim **4**, wherein data objects include contacts.

7. The method of claim **4**, wherein data objects include calendar items.

8. The method of claim **1**, wherein in the interface, the user is able to select a media-specific view to see in the view window from one of a plurality of media-specific views available for view in the view window.

9. The method of claim **8**, wherein the plurality of media-specific views include a photo view, a music view, a video view, and a documents view.

10. A method for viewing files from a plurality of devices, the method comprising:

storing by a server files from a user's plurality of devices;

providing an interface to the server via which the user is able to view the stored files, wherein the interface has a view window and, within the view window, the user is able to view, at the user's discretion, either a media-specific view or one of a plurality of file-system views, wherein each file-system view corresponds to a local file-system view on a different one of the plurality of devices and files within each file-system view are organized in the same way as files are organized in the corresponding local file-system view, and wherein the media-specific view is a compilation view of all the stored files that are designated with a particular media category;

enabling the user to perform file operations in each of the file-system views in the interface, wherein file operations include deleting files from folders, copying files in folders, and pasting files to folders and wherein performing a file-system operation in a file-system view in the interface causes the file-system on the device to which the file-system view corresponds to be altered in accordance with the performed file-system operation;

enabling the user to perform content-specific operations in the media-specific view in the interface; and

enabling a user to switch between the file-system and media-specific views in the view window, and switching automatically from the media-specific view to the file-system view responsive to a file system operation performed in the media-specific view.

11. The method of claim **10**, wherein the interface is a web interface.

12. The method of claim **10**, wherein the media-specific view is a photo view in which a compilation of all the stored files designated as photos are displayed.

13. The method of claim **10**, wherein the media-specific view is a music view in which a compilation of all the stored files designated as music files are displayed.

14. The method of claim **10**, wherein the media-specific view is a video view in which a compilation of all the stored files designated as video files are displayed.

15. The method of claim **10**, wherein the media-specific view is a document view in which a compilation of all the stored files designated as documents are displayed.

16. The method of claim **10**, wherein a user also can view and edit data objects through the interface and the media-specific view corresponds to a type of data object.

17. The method of claim **16**, wherein data objects include email messages.

18. The method of claim **16**, wherein data objects include contacts.

19. The method of claim **16**, wherein data objects include calendar items.

20. The method of claim **10**, wherein in the interface, the user is able to select a media-specific view to see in the view window from one of a plurality of media-specific views available for view in the view window.

21. The method of claim **20**, wherein the plurality of media-specific views include a photo view, a music view, a video view, and a documents view.

22. The method of claim **10**, wherein one or more of the stored files are synchronized across two or more of the plurality of devices and, in response to a user making a change, via the interface, to a synchronized file, propagating the change to all the user's devices having the synchronized file.

23. The method of claim **10**, wherein the stored files are organized into folders and wherein one or more folders are synchronized across two or more of the plurality of devices, and in response to a user making a change, via the interface, to a synchronized folder or to a file within the synchronized folder, propagating the change to all the devices having the synchronized folder.

24. A computer program embodied on one or more non-transitory computer-readable media and comprising code that when executed by a computer system, enables the computer system to perform the following method for viewing files from a plurality of devices, the method comprising:

storing by a server files from a user's plurality of devices;

providing an interface to the server via which the user is able to view the stored files, wherein the interface has a view window and, within the view window, the user is able to view, at the user's discretion, either a media-specific view or one of a plurality of file-system views, wherein each file-system view corresponds to a local file-system view on a different one of the plurality of devices and files within each file-system view are organized in the same way as files are organized in the corresponding local file-system view, and wherein the media-specific view is a compilation view of all the stored files that are designated with a particular media category;

enabling the user to perform file operations in each of the file-system views in the interface, wherein file operations include deleting files from folders, copying files in folders, and pasting files to folders and wherein performing a file-system operation in a file-system view in the interface causes the file-system on the device to which the file-system view corresponds to be altered in accordance with the performed file-system operation;

enabling the user to perform content-specific operations in the media-specific view in the interface; and

enabling a user to switch between the file-system and media-specific views in the view window, and switching automatically from the media-specific view to the file-

system view responsive to a file system operation performed in the media-specific view.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,032,295 B1
APPLICATION NO. : 12/077533
DATED : May 12, 2015
INVENTOR(S) : Vivek Patel

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, Item (57) Abstract should read:

(57) **ABSTRACT**

In a synchronization or back-up system that synchronizes and/or **backs-up** files from multiple computing devices, the present invention provides a method for (1) displaying files from multiple computing devices in a multi-view user interface and (2) enabling content and file operations to be performed on such files through the user interface. The multi-view interface includes a file-system view and one or more media-specific views. In the file-system view files are organized in the same way in which they are organized on the devices on which they are stored. The file-system view in the interface looks essentially the same as the file-system view on client devices. In the file-system view, users can perform file operations on files. In the media-specific view files are organized by media category. In one embodiment of the media-specific view, files are organized by metadata that relates to the **content of the files**. In the media-specific view, users can perform content operations on the files.

Signed and Sealed this
Third Day of May, 2016

Michelle K. Lee

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