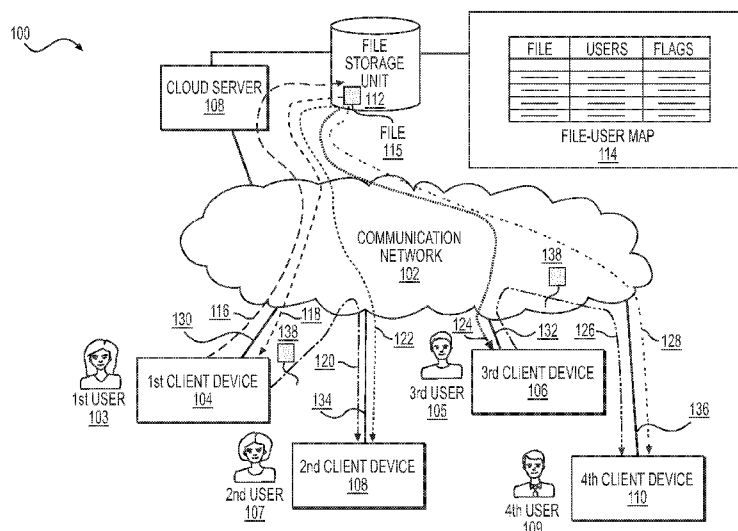




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(54) **Title:** METHOD AND SYSTEM FOR CONTROLLING DOWNLOADING OF A FILE IN A CLOUD STORAGE SERVICE**FIG. 1**

(57) **Abstract:** There are provided a method and a system for controlling downloading of a file in a cloud storage service. The method can be executed at a server. The method comprises appreciating an activity parameter representative of total download activity of a file from a cloud storage service via a communication network, and, responsive to the activity parameter being above a pre-determined threshold, applying a remedial action to the downloading of the file, such that the remedial action is applied only to downloading of the file via a data transmittal path that a user has received from the user who uploaded the file to the cloud storage service, and downloading of the file by the user who uploaded the file is not affected.

METHOD AND SYSTEM FOR CONTROLLING DOWNLOADING OF A FILE IN A CLOUD STORAGE SERVICE

CROSS-REFERENCE

[01] The present application claims convention priority to Russian Patent Application No. 2014110276, filed March 17, 2014, entitled "A METHOD AND A SYSTEM FOR CONTROLLING DOWNLOADING OF A FILE IN A CLOUD STORAGE SERVICE" which is incorporated by reference herein in its entirety

FIELD

[02] The present technology relates to cloud storage services in general and specifically to a system and method for controlling downloading of a file in a cloud storage service.

BACKGROUND

[03] A cloud platform delivers computing as a service to one or more clients. For example, a cloud platform may deliver an infrastructure (e.g., storage media), provide software, or make particular computing platforms available to clients. A cloud platform does not merely connect various components as in conventional networks, but provides instead computing services and infrastructures, which are independent of the devices used by the clients (or users). Therefore, by using cloud platforms it becomes possible to delegate setting up and maintenance of computing systems to an external provider and therewith to increase significantly the efficiency, capability, or flexibility of an information technology (IT) infrastructure.

[04] For example, a user may operate in various contexts, wherein in each of them the user plays a different role and has different responsibilities. These different roles might relate to the professional or personal life of the user in the role of employee, contractor, customer, supplier, or family member, for example. Within these various contexts, a user may use different client devices (e.g., desktop computers, laptop computers, personal computers, mobile phones, tablets, etc.) or client devices that utilize remote processing capability (e.g., applications hosted on a web site or a virtual machine hosted in a data center). Different computing environments might be installed on client devices with local processing capabilities (e.g., different operating systems, virtual software environments, Web

applications, native applications, containers, BIOS/APIs, etc.) to interact with a cloud platform.

[05] Further, various global or local communications networks (the Internet, the World Wide Web, local area networks, and the like) offer a user a vast amount of information. The information includes a multitude of contextual topics, such as but not limited to, news and current affairs, maps, company information, financial information and resources, traffic information, games and entertainment-related information. Users use a variety of client devices (desktop computers, laptop computers, notebooks, smartphones, tablets, and the like) to have access to rich content (such as images, audio, video, animation, and other multimedia content from such networks).

[06] Generally speaking, a given user can access computing services on a cloud platform regardless of predetermined hardware/software systems and communications networks in use. A user can access a cloud platform via a communications network by two principle means. A given user can access a particular resource directly, either by typing an address of the resource (typically an Universal Resource Locator (URL), such as www.webpage.com) or by clicking a link in an e-mail or in another web resource.

[07] A given user may use a cloud platform for file storage purposes. Typically, a user may use a cloud storage service to store files for a multitude of purposes, such as data archival, ease of access to the file irrespective of location or time, sharing of the file with other users, and the like. A variety of files may be stored on a cloud storage service, including files used for personal or professional use, such as data files, portable document format (pdf) files, word processing files, text files, images, photographs, multimedia content for entertainment purposes, and the like. In some instances files containing copyrighted material may be stored, such as audio, video, animation, literary, artistic, and other such materials.

[08] In cloud storage services, various problems have to be solved. It is important that a cloud storage service is able to manage applications and associated policies which are provided to users. For example, a cloud storage service should be able to monitor and control use of the service to protect intellectual property of third-party content providers and to prevent illegal or otherwise inappropriate activities, such as piracy or other illegal downloading and file-sharing activities. As another example, it is important for a cloud

storage service to provide consistent performance parameters to a plurality of users, such as a desired amount of available channel bandwidth, download speed, upload speed, storage space, and other such performance characteristics. Frequent downloading of large files by one or more users can have a detrimental impact on performance parameters for other users who are also using the cloud storage service, for example by consuming an excessive amount of channel bandwidth. It is important therefore for a cloud storage service to manage client use in order to maintain desired performance standards.

[09] US 2014/0010082 (Sarkar et al.) teaches a computer-implemented method for prevention of bandwidth abuse of a communications system. The method includes providing a user with an initial number of credits, where the credits are consumed by downloading data. As the user consumes the credits, the data being downloaded is checked to determine if it is permissible or non-permissible data, non-permissible data including file-sharing files and movie downloads if user subscription does not permit such activity. If the data is permissible, the user is provided another allotment of credits equal to the initial allotment. If the data is non-permissible, the user is provided an allotment of credits less than the initial allotment, and various restriction policies can also be applied, such as levying additional fees and/or terminating the user's access to the channel.

SUMMARY

[10] It is an object of the present technology to ameliorate at least some of the inconveniences present in the prior art. Embodiments of the present technology have been developed based on inventors' appreciation that there is a need for systems and methods for controlling client use of cloud-based resources, such as controlling downloading of files in a cloud storage service.

[11] In one aspect, implementations of the present technology provide a method of controlling downloading of a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service. In an implementation, the method includes appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network; and, responsive to the activity parameter being above a pre-

determined threshold, applying a first remedial action to the downloading of the first file. In a further implementation, the first user sends a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user; the total download activity comprises download activity via the first hyperlink and download activity
5 by the first user; and the first remedial action is applied only to downloading of the first file via the first hyperlink, such that downloading of the first file by the first user is not affected.

[12] In some implementations, a second file is uploaded by a third client device associated with a third user via the communication network, the second file being compared after uploading to the first file using a deduplication process; if the second file is not duplicative of
10 the first file in the cloud storage service, then the second file is stored in the cloud storage service in association with the third user, however, if the second file is duplicative of the first file in the cloud storage service, then the second file is not stored in the cloud storage service, and an association is created between the first file and the third user. In a further implementation, the third user sends a second hyperlink for accessing the first file via the
15 communication network to a fourth client device associated with a fourth user; the total download activity comprises download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; and the first remedial action is applied only to downloading the first file via the first hyperlink and the second hyperlink, such that downloading of the first file by the first user and the third user is not
20 affected.

[13] In some implementations, after the first remedial action has been applied, the method includes appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after
25 said appreciating of said activity parameter; and, responsive to the second activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.

[14] In some implementations, after the first remedial action has been applied, the method includes appreciating a second activity parameter representative of total download activity of
30 the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being

above the pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third activity parameter and the fourth activity parameter being
5 above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

[15] In an implementation, there is provided a method of controlling downloading of a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user
10 being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service; wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user; wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage
15 service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user (e.g., using a deduplication process); wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user; wherein the method includes: appreciating an activity parameter representative of total download activity
20 of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; and, responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein
25 downloading of the first file by the first user and the third user is not affected. In some implementations, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, the method includes appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity
30 parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and, responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user. In some alternative implementations, after

the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, the method includes appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third activity parameter and the fourth activity parameter being above either the pre-determined threshold or the second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

[16] In an aspect, implementations of the present technology provide a server configured to control downloading of a first file in a cloud storage service, the server hosting the cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; wherein the server is configured to appreciate an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network; and, responsive to the parameter being above a pre-determined threshold, apply a first remedial action to the downloading of the first file.

[17] In some implementations, a server is further configured to apply the first remedial action only to downloading of the first file via a first hyperlink for accessing the first file via the communication network, the first hyperlink having been sent by the first user to a second client device associated with a second user; the total download activity comprising download activity via the first hyperlink and download activity by the first user; such that downloading of the first file by the first user is not affected by the remedial action.

[18] In some implementations, a server is further configured to apply the first remedial action to downloading of the first file via the first hyperlink and a second hyperlink for accessing the first file via the communication network; the second hyperlink having been sent by a third user to a fourth client device associated with a fourth user, the third user having

uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user (e.g., using a deduplication process); the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; such that downloading of the first file by the first user and the third user is not affected by the first remedial action. In some alternative implementations, a server is further configured to, after the first remedial action has been applied, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and, responsive to the second activity parameter being above the pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user. In some alternative implementations, a server is further configured to, after the first remedial action has been applied, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being above the pre-determined threshold, appreciate a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third and fourth activity parameter being above a second pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

[19] In some implementations, there is provided a server configured to control downloading of a first file in a cloud storage service, the server hosting the cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user; wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an

association was created between the first file and the third user (e.g., using a deduplication process); wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user; and wherein the server is configured to: appreciate an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; and, responsive to the activity parameter being above a pre-determined threshold, apply a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected. In some implementations, the server is further configured to, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and, responsive to the second activity parameter being above a second pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user. In some implementations, the server is further configured to, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being above the pre-determined threshold, appreciate a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third activity parameter and the fourth activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

[20] In implementations provided herein, a server may be an individual server or a plurality of servers.

[21] In some implementations, an activity parameter is the number of times a first file is downloaded. In some implementations, an activity parameter is the number of different users downloading a first file. In some implementations, an activity parameter is the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network. In some implementations, an activity parameter is a combination of at least two of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network. A second activity parameter, third activity parameter, and fourth activity parameter may also be any one of the foregoing, or a combination thereof. A first activity parameter, second activity parameter, third activity parameter, and fourth activity parameter may be selected independently of each other, and may be the same or different.

[22] In some implementations, a pre-determined threshold is the first file being downloaded at least 100 times. In some implementations, a pre-determined threshold is the first file being downloaded at least 300 times. In some implementations, a pre-determined threshold is the first file being downloaded by at least 100 different users. In some implementations, a pre-determined threshold is the first file being downloaded by at least 300 different users. In some implementations, a pre-determined threshold is at least 100 GB of bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network. In some implementations, a pre-determined threshold is a combination of the foregoing. A second pre-determined threshold may also be any one of the foregoing, or a combination thereof. A first and a second pre-determined threshold may be the same or different.

[23] In some implementations, a pre-determined period of time is at least one day. In some implementations, a pre-determined period of time is at least one week. A first and a second pre-determined period of time may be the same or different.

[24] Similarly, a first hyperlink and a second hyperlink may be the same or different.

[25] In some implementations, a remedial action is reducing speed of the downloading activity. In some implementations, a remedial action is not allowing the downloading activity. Non-limiting examples of not allowing the downloading activity include removing or deactivating a button for downloading a file, a button for previewing a file, or a hyperlink for

accessing a file. In some implementations, a remedial action comprises restricting downloading activity to between the hours of 10 pm and 6 am in the user's local time zone. In some implementations, a remedial action is a combination of the foregoing. A first and a second remedial action may be the same or different.

5 [26] In some implementations, applying a remedial action is executed at a server. In some implementations, applying a remedial action includes generating a trigger; a server sending the trigger via the communication network to a second client device and a fourth client device; and the trigger causing the second client device and the fourth client device to apply the remedial action to the downloading of the first file by the second user and the fourth user,
10 respectively, via the first hyperlink and the second hyperlink, respectively. In some implementations, applying a remedial action includes generating a trigger; a server sending the trigger via the communication network to a second client device; and the trigger causing the second client device to apply the remedial action to the downloading of the first file by the second user via the first hyperlink.

15 [27] In some implementations, total download activity includes download activity by a first user, a second user, a third user, and a fourth user; in other words, total download activity can include download activity by all users, including registered (first user and third user being examples of registered users) and public (second user and fourth user being examples of public users) users. In alternative implementations, total download activity includes
20 download activity by a second user and a fourth user only; in other words, total download activity includes only download activity by users using a hyperlink to access a file, i.e., public users.

[28] In some implementations of the present technology, there are provided methods and systems for controlling downloading of a first file in a cloud storage service, the first file
25 having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service; wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;
30 wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first

file and the third user; the first user and the third user being registered users of the cloud storage service, and the second user and the fourth user being public users; wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user; the method comprising appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user (i.e., the total download activity comprising download activity by both registered users and public users); and, responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected (i.e., downloading of the first file by the registered users is not affected).

[29] In some implementations, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, the method further comprises appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and, responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user (i.e., applying a second remedial action to the downloading of the first file by any one of the registered users).

[30] In some alternative implementations, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, the method further comprises appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively (i.e., by the registered users); responsive to any one of the third activity

parameter and the fourth activity parameter being above any one of said pre-determined threshold and the second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user (i.e., any one of the registered users), respectively.

5 [31] It should be expressly understood that in implementations of the technology, total download activity may include total download activity by all users, including both registered and public users, or alternatively, in some implementations may include only total download activity by registered users or only total download activity by public users. It should also be understood that a pre-determined threshold may be set independently for registered users and
10 public users; a pre-determined threshold (e.g., a download limit) for registered users may be the same as or different from a pre-determined threshold for public users. Similarly, a remedial action may be applied only to download activity by public users, only to download activity by registered users, or to both, and a remedial action applied to a registered user may be the same as or different from a remedial action applied to a public user.

15 [32] In another aspect, implementations of the present technology provide methods and systems for controlling download of a copyrighted material, the copyrighted material being found in a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network, the first user being one of a plurality of users associated with the cloud storage
20 service, and the method being executable at a server hosting the cloud storage service. The method includes appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via a first hyperlink and a second hyperlink and download activity by the first user and the third user; and, responsive to the activity
25 parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected; wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user; wherein the first file is further
30 associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user (e.g., using a deduplication process); and wherein the third user has sent a second hyperlink for

accessing the first file via the communication network to a fourth client device associated with a fourth user. In some implementations, the method further includes, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total
5 download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and, responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the
10 third user. In alternative implementations, the method further includes, after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period
15 of time after said appreciating of said activity parameter; responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third activity parameter and the fourth
20 activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

[33] In another aspect, implementations of the present technology provide a non-transitory computer readable storage medium storing instructions, which when executed by at least one
25 processor causes performance of: appreciating an activity parameter representative of total download activity of a first file from a cloud storage service via a communication network, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via the communication network; the first user being one of a plurality of users associated with the cloud storage service; wherein the first user has sent a
30 first hyperlink for accessing the first file via the communication network to a second client device associated with a second user; wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an

association was created between the first file and the third user (e.g., using a deduplication process); wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user; the total download activity comprising download activity via the first hyperlink and the second
5 hyperlink and download activity by the first user and the third user; and, responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected.

[34] In some implementations, the computer readable storage medium further causes
10 performance of: after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and,
15 responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.

[35] In some alternative implementations, the computer readable storage medium further causes performance of: after the first remedial action has been applied to the downloading of
20 the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; responsive to the second activity parameter being above a second pre-determined
25 threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively; and, responsive to any one of the third activity parameter and the fourth activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file
30 by any one of the first user and the third user, respectively.

[36] In the context of the present specification, a “server” is a computer program that is running on appropriate hardware and is capable of receiving requests (e.g., from client

devices) over a network (e.g., a communication network), and carrying out those requests, or causing those requests to be carried out. The hardware may be one physical computer or one physical computer system, but neither is required to be the case with respect to the present technology. In the present context, the use of the expression a “server” is not intended to mean that every task (e.g., received instructions or requests) or any particular task will have been received, carried out, or caused to be carried out, by the same server (i.e., the same software and/or hardware); it is intended to mean that any number of software elements or hardware devices may be involved in receiving/sending, carrying out or causing to be carried out any task or request, or the consequences of any task or request; and all of this software and hardware may be one server or multiple servers, both of which are included within the expressions “at least one server” and “a server”.

[37] In the context of the present specification, a “client device” is any computer hardware that is capable of running software appropriate to the relevant task at hand. Thus, some non-limiting examples of client devices include personal computers (e.g., desktops, laptops, netbooks, etc.), smartphones, and tablets, as well as network equipment such as routers, switches, and gateways. It should be noted that a device acting as a client device in the present context is not precluded from acting as a server to other client devices. The use of the expression “a client device” does not preclude multiple client devices being used in receiving/sending, carrying out or causing to be carried out any task or request, or the consequences of any task or request, or steps of any method described herein.

[38] In the context of the present specification, a “database” is any structured collection of data, irrespective of its particular structure, the database management software, or the computer hardware on which the data is stored, implemented or otherwise rendered available for use. A database may reside on the same hardware as the process that stores or makes use of the information stored in the database or it may reside on separate hardware, such as a dedicated server or plurality of servers. In some embodiments, a file-user map is a type of database including, for example, a file identification number or name; identification of the users associated with the file; and a flag to indicate relevant download activity for the file, such as an indication that a pre-determined threshold of download activity has been reached or exceeded.

[39] In the context of the present specification, the expression “file” includes a file containing information of any nature or kind whatsoever capable of being stored in a

computer system. This information includes, but is not limited to audiovisual works (images, movies, sound records, presentations etc.), data (location data, numerical data, etc.), text (opinions, comments, questions, messages, etc.), documents, spreadsheets, etc. Any type of file format for encoding information capable of storage in a computer system is included; non-limiting examples of such file formats include archive file formats, bibliography file formats, chemical file formats, debugging data formats, dictionary formats, email storage formats, executable file formats, font formats, graphics file formats, office document file formats, playlist file formats, spreadsheet file formats, text file formats, audiovisual file formats, and the like.

10 [40] In the context of the present specification, the expression “computer usable information storage medium” is intended to include media of any nature and kind whatsoever. Computer storage media can include volatile and non-volatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules, or other data. Computer storage
15 media can include, but is not limited to, random access memory (RAM), read only memory (ROM), electrically erasable programmable ROM (EEPROM), flash memory, or other memory technology, compact disk ROMs (CD-ROMs), digital versatile disks (DVDs) or other optical storage, floppy disks, hard drives, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, USB keys, solid state-drives, tape drives, or
20 any other medium that can be used to store the desired information and that can be accessed to retrieve that information.

[41] In the context of the present specification, the expression “communication network” is intended to include a telecommunications network such as a computer network, the Internet, a telephone network, a Telex network, a TCP/IP data network (e.g., a WAN network, a LAN
25 network, etc.), and the like. The term “communication network” includes a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), infrared and other wireless media, as well as combinations of any of the above.

[42] In the context of the present specification, the expression “cloud storage service” is intended to include computing facilities where multiple clients, client devices, communities,
30 IT domains, and/or applications are managed or administrated separately in a multi-tenant-environment. A “cloud” environment relates to a structure wherein multiple independent users share a common set of infrastructure, platforms, services/applications, or resources in a

manner that isolates them from each other securely. A user/client may be a company, an organization, or a private person, and a client device may refer to any of a range of end-user client devices, as described herein. Such a cloud service provides connectivity to be used, for example, by personal computers, tablets, smart phones, or other end user-connected devices (home entertainment, etc.). Many types of cloud services are known. For example, a cloud service may comprise decoupled administration models applicable to server blades in a data center, or any distribution of connected devices. The common set of infrastructure, platforms, services/applications, or resources is typically managed by an administrator, which manages and maintains the cloud service. Cloud-based resources may be public or private.

10 [43] In the context of the present specification, the expression “download” is intended to include transfer or copy of data from one computer system to another or to a disk. Typically, “downloading” refers to receiving data to a local system from a remote system, or to initiation of such a data transfer. Generally, when downloading data, the data is only usable when it has been received in its entirety. The data may be simply received, or may be received and saved locally. As used herein, the term “downloading” is intended to include “streaming,” which indicates the receiving of data that is used near immediately as it is received, while the transmission is still in progress and which may not be stored long-term. The term “downloading” is also intended to include a combination of traditional downloading and streaming such as “side-loading” in which a media program is loaded in parallel with a playing of the media program or another media program.

[44] In the context of the present specification, the expression “upload” is intended to include the sending of data from a local system to a remote system such as a server with the intent that the remote system should store a copy of the data being transferred, or the initiation of such a process. As used herein, the term “uploading” is intended to include “remote uploading,” in which there is a transfer of data from a remote system to another remote system, i.e., the data being uploaded need not be located on a user’s local network.

[45] As used herein, “media program” may refer to media data containing audio content including but not limited to any of: audio data, audio transcription data, audiovisual data, multimedia data, internet downloaded content data, multimedia data with markup language pages, videos, movies, multimedia presentations, audio books, electronic books, podcasts, etc. A media data unit may refer to a data unit containing audio data including but not limited to audio samples, audio transcription data that may be used for voice synthesis, audio data units,

audiovisual data units, media data segments, image frames, etc. Media data may be received by a system as described herein using one or more of wire-based links or wireless links. Media data may be received in the form of a media file, a media data stream, etc. Media data may be received with any of a wide variety of formats defined by standard or proprietary specifications including but not limited to any related to CD, MPEG-1, MPEG-2, and MPEG-2.5 Audio Layer III (MP3), Advanced Audio Coding (AAC), DVD, HD DVD, Blu-ray Disc, H.261, H.263, H.264/MPEG-4, etc. A media program may or may not contain copyrighted material.

[46] In the context of the present specification, the expression “copyrighted material” is intended to include material which is copyright protected, such as an artistic work, a literary work, a photograph, an audiovisual work, a video, a software code, and the like. A file containing copyrighted material may only be copied without limitation legally if digital rights are obtained by the user. “Digital rights” as described herein include but are not limited to any of playing rights, copying rights, distribution rights, recording rights, etc.

[47] In the context of the present specification, the words “first”, “second”, “third”, etc. have been used as adjectives only for the purpose of allowing for distinction between the nouns that they modify from one another, and not for the purpose of describing any particular relationship between those nouns. Thus, for example, it should be understood that, the use of the terms “first user” and “third user” is not intended to imply any particular order, type, chronology, hierarchy or ranking (for example) of/between the users, nor is their use (by itself) intended to imply that any “second user” must necessarily exist in any given situation. Further, as is discussed herein in other contexts, reference to a “first” element and a “second” element does not preclude the two elements from being the same actual real-world element. Thus, for example, in some instances, a “first” server and a “second” server may be the same software and/or hardware, in other cases they may be different software and/or hardware.

[48] Implementations of the present technology each have at least one of the above-mentioned object and/or aspects, but do not necessarily have all of them. It should be understood that some aspects of the present technology that have resulted from attempting to attain the above-mentioned object may not satisfy this object and/or may satisfy other objects not specifically recited herein.

[49] Additional and/or alternative features, aspects and advantages of implementations of the present technology will become apparent from the following description, the accompanying drawings and the appended claims.

5

BRIEF DESCRIPTION OF THE DRAWINGS

[50] For a better understanding of the present technology, as well as other aspects and further features thereof, reference is made to the following description which is to be used in conjunction with the accompanying drawings, where:

[51] Figure 1 is a schematic diagram depicting a system 100, the system 100 being
10 implemented in accordance with non-limiting embodiments of the present technology.

[52] Figure 2 is a block diagram depicting a method 200, the method 200 being implemented within the system 100 of Figure 1 and being implemented according with non-limiting embodiments of the present technology.

[53] Figure 3 is a block diagram depicting a method 300, the method 300 being
15 implemented in accordance with another non-limiting embodiment of the present technology.

[54] Figure 4 depicts a screen shot 400, the screen shot 400 illustrating a standard interface for storing and downloading a file in a cloud storage service.

DETAILED DESCRIPTION

20 [55] Referring to Figure 1, there is shown a schematic diagram of a system 100, the system 100 being suitable for implementing non-limiting embodiments of the present technology. It is to be expressly understood that the system 100 as depicted is merely an illustrative implementation of the present technology. Thus, the description thereof that follows is intended to be only a description of illustrative examples of the present technology. This
25 description is not intended to define the scope or set forth the bounds of the present technology. In some cases, what are believed to be helpful examples of modifications to the system 100 may also be set forth below. This is done merely as an aid to understanding, and, again, not to define the scope or set forth the bounds of the present technology. These

modifications are not an exhaustive list, and, as a person skilled in the art would understand, other modifications are likely possible. Further, where this has not been done (i.e. where no examples of modifications have been set forth), it should not be interpreted that no modifications are possible and/or that what is described is the sole manner of implementing that element of the present technology. As a person skilled in the art would understand, this is likely not the case. In addition it is to be understood that the system 100 may provide in certain instances simple implementations of the present technology, and that where such is the case they have been presented in this manner as an aid to understanding. As persons skilled in the art would understand, various implementations of the present technology may be of a greater complexity.

[56] The system 100 comprises a communication network 102. The communication network 102 is typically associated with a plurality of client devices associated respectively with a plurality of users. A first client device 104, a second client device 108, a third client device 106, and a fourth client device 110 associated with a first user 103, a second user 107, a third user 105, and a fourth user 109, respectively, are indicated in the figure for illustrative purposes. It should be noted that the fact that the client devices are associated with specific users does not need to suggest or imply any mode of operation – such as a need to log in, a need to be registered or the like.

[57] The communication network 102 is also associated with a cloud server 108. The cloud server 108 hosts a cloud storage service and is typically associated with a file storage unit 112. The implementation of the cloud server 108 is not particularly limited, but as an example, the cloud server 108 may be implemented as a single server. Alternatively, the cloud server 108 can be implemented as a plurality of servers. Within the latter embodiments, each of the plurality of servers implementing the cloud server 108 may be responsible for storing files from users in a particular region; or a particular type of users; or a particular type or size of files. Alternatively, each of the plurality of servers implementing the cloud server 108 may be configured to store files according to a load-balancing approach executed by a supervisory entity (which can be one of the plurality of servers). The file storage unit 112 is typically a unit capable of storing files and data. A file 115 stored in the file storage unit is shown for illustrative purposes. Like the cloud server 108, the file storage unit 112 may be implemented as a single unit, or alternatively as a plurality of units.

[58] The file storage unit 112 is typically associated with a file-user map 114. A file-user map 114 will typically include a file identification number or name; identification of the users associated with the file (to be described in greater detail herein below); and a flag to indicate relevant download activity for the file, such as an indication that a pre-determined threshold of download activity has been reached or exceeded. A flag in a file-user map can be information associated with a file indicating applicable download limits (e.g., a pre-determined threshold that has been set for a particular file), download activity, type and duration of remedial actions which have been applied, status (e.g., whether or not a remedial action has been applied to a particular file), etc., or any combination thereof.

10 [59] Implementation of a file-user map is not particularly limited. The file-user map 114 may be stored in the file storage unit 112 or the cloud server 108 or some combination thereof.

[60] At least one data transmittal path is typically associated with each user, illustrating transmittal of data by the user in the communication network 102 (when such user is active on the communication network 102 – i.e., when the user uploads or downloads files or performs other activity on the communication network 102). Data transmittal path 116 illustrates upload of a file 115 by the first user 103 to the cloud storage service (including the cloud server 108 and file storage unit 112) via the communication network 102. Data transmittal path 118 illustrates download of the file 115 by the first user 103 from the cloud storage service (including the cloud server 108 and file storage unit 112) via the communication network 102, for example, when the first user 103 is desirous of accessing their previously-uploaded file.

[61] Data transmittal path 120 illustrates sending, by the first user 103 using the first client device 104, of a hyperlink 138 for accessing the file 115 via the communication network 102, to a second client device 108 associated with a second user 107. Data transmittal path 122 illustrates downloading of the file 115 by the second user 107 to the second client device 108 via the communication network 102, the downloading by the second user 107 being via the hyperlink 138 provided by the first user 103.

[62] Data transmittal path 124 illustrates an uploading of the file 115 by the third client device 106 of the third user 105. Data transmittal path 126 illustrates sending of a hyperlink 138 for accessing the file 115 via the communication network 102 to a fourth client device

110 associated with a fourth user 109. Data transmittal path 128 illustrates downloading of the file 115 by the fourth user 109 to the fourth client device 110 via the communication network 102, the downloading by the fourth user 109 being via the hyperlink 138 provided by the third user 105. It is intended that data transmittal paths illustrated in Figure 1 are
5 exemplary only, and that many other such data transmittal paths between a plurality of users are possible.

[63] In the implementation illustrated in Figure 1, the first user 103 and the third user 105 send the same hyperlink 138 to client devices 108 and 110, respectively. In some embodiments of the present technology, the hyperlink 138 sent by the first user 103 and the
10 third user 105 are the same, as depicted in Figure 1. However, it should be understood that in some embodiments, different users may send different hyperlinks (not depicted) to other users. In other words, in some embodiments (not shown), the first user 103 and the third user 105 send different hyperlinks to client devices 108 and 110, respectively, for accessing file 115 via the communication network 102. It should be expressly understood that in
15 implementations of the technology, separate hyperlinks may be independent of each other, i.e., a first hyperlink may be the same as or different from a second hyperlink.

[64] Client devices 104, 106, 108 and 110 are coupled to communication network 102 via respective communication link 130, 132, 134, 136. In some non-limiting embodiments of the present technology, the communication network 102 can be implemented as the Internet. In
20 other embodiments of the present technology, the communication network 102 can be implemented differently, such as any wide-area communications network, local-area communications network, a private communications network and the like.

[65] How a communication link 130, 132, 134, 136 is implemented is not particularly limited and will vary depending on how the communication network 102 and the respective
25 client devices 104, 106, 108 and 110 are implemented. Merely as an example and not as a limitation, in those embodiments of the present technology where the first client device 104 is implemented as a wireless communication device (such as a smartphone), the communication link 130 can be implemented as a wireless data transmittal path (such as but not limited to, a 3G communications network link, a 4G communications network link, a Wireless Fidelity, or
30 WiFi® for short, a Bluetooth®, and the like). In those examples, where the first client device 104 is implemented as a notebook computer, the communication link 130 can be either wireless (such as Wireless Fidelity, or WiFi® for short, Bluetooth® or the like) or wired

(such as an Ethernet based connection). Different client devices and different data transmittal paths may be implemented independently of each other. It should be understood therefore that different client devices can be implemented differently and that data transmittal paths will vary accordingly.

5 [66] It should be expressly understood that implementations for client devices 104, 106, 108, and 110, communication link 130, 132, 134, 136, and communication network 102 are provided for illustration purposes only. As such, those skilled in the art will easily appreciate other specific implementational details for these elements. As such, examples provided herein above are not meant to limit the scope of the present technology.

10 [67] The cloud server 108 can be implemented as a conventional computer server. In an example of an embodiment of the present technology, the cloud server 108 is implemented as a Dell™ PowerEdge™ Server running the Microsoft™ Windows Server™ operating system. It should be understood that the cloud server 108 can be implemented in any other suitable hardware and/or software and/or firmware or a combination thereof. In the depicted non-
15 limiting embodiment of present technology, the cloud server 108 is a single server. In alternative non-limiting embodiments of the present technology, the functionality of the cloud server 108 may be distributed and may be implemented via multiple servers, e.g., the cloud server 108 may be implemented as a plurality of servers.

[68] The cloud server 108 is communicatively coupled (or otherwise has access) to a file
20 storage unit 112. The general purpose of the file storage unit 112 is to store data, e.g., files, uploaded by users 103, 105, 107, and 109 to the cloud server 108. The implementation of the file storage unit 112 is not particularly limited. It should be understood that any suitable hardware for storing data may be used. In some implementations, the file storage unit 112 may be physically contiguous with the cloud server 108, i.e., they are not necessarily separate
25 pieces of hardware, as depicted, although they may be.

[69] In alternative non-limiting embodiments of the present technology, the file-user map 114 may be implemented as a database or a table mapping a particular file to a user (or users) who have access to or who have uploaded the particular file.

[70] For further understanding and illustration of the system 100, reference is now made to
30 Figure 4, which depicts a screen shot 400 of a standard interface for storing, downloading or sharing a file 115 in a cloud storage service. It should be noted that Figure 4 is for illustration

purposes only to assist in understanding of the cloud storage service. It should also be understood that Figure 4 contains a multitude of information, only relevant portions of which will be enumerated and described. The screen shot 400 shows a browser application 418 opened using an internet browser. A typical browser command interface 410 is depicted for illustrative purposes only.

[71] The screen shot 400 shows a preview 412 of a data file and bibliographic information 414 for the file. In the depicted embodiment, the preview 412 comprises an image of a first page of the document stored in the data file. In alternative embodiments, the preview 412 may comprise an icon associated with a software application for managing the data file, an image preview of the information stored in the data file and the like.

[72] There are also shown: an upload button 402 for uploading the file 115 to the cloud server 108; a download button 404 for downloading the file 115 from the cloud server 108; a preview button 406 for viewing the file 115 (in a pop-up preview window or the like); and a link field 408. The link field 408 is for generating a public link to the data file 115, the public link allowing other users (i.e., users other than the user who has uploaded the data file 115 to the cloud server 108) to access, view, or download the file 115. In some embodiments, such as the ones illustrated in Figure 1 and Figure 4, the public link generated in the link field 408 is the same as the hyperlink 138 which can be sent by users 103, 105 to users 107, 109 for accessing the file 115.

[73] In the implementation illustrated in Figure 4, the screen shot 400 depicts a user accessing a cloud storage service with a browser application 418. The browser application 418 has a command interface 410. The browser application 418 further comprises an address bar 416 to allow the user to type or copy-and-paste a Unified Resource Locator (URL) or, simply, an address associated with the web resource the user is looking for. The browser application 418 further comprises browser control buttons panel 422 which includes conventionally known buttons for navigating in the browser application 418 or in the internet. The browser application 418 also includes the well-known close button 426 for closing the browser application 418 and the well-known back button 420 for allowing the user to go back to one or more of the previously viewed web resources.

[74] How the cloud storage service is accessed by a user is not particularly limited. As one example, as depicted in Figure 4, a user may access a web site associated with the cloud

server 108. For example, the cloud server 108 can be accessed by typing in an URL associated with Yandex search engine at www.yandex.ru. It should be expressly understood that cloud server 108 may be accessed using any other commercially available or proprietary search engine. Yandex browser application 418 may be used as depicted, i.e., a client device
5 may be executing a Yandex browser application. It should be expressly understood that any other commercially available or proprietary browser application can be used for implementing non-limiting embodiments of the present technology. Further, any other suitable interface for accessing the cloud server 108 can be used.

[75] Reference will now be made to Figure 2, which depicts a block diagram of a method
10 200, the method 200 being implemented in accordance with a non-limiting embodiment of the present technology. The method 200 can be conveniently executed at the cloud server 108.

[76] **Step 202 – appreciating an activity parameter representative of total download activity of a first file from a cloud storage service via a communication network**

[77] The method 200 begins at step 202, where a cloud server 108 appreciates an activity
15 parameter representative of total download activity of file 115 via communication network 102. In some non-limiting embodiments of the present technology, an activity parameter is any suitable measure of download activity, such as but not limited to: the number of times a file is downloaded, the number of different users downloading a file, the bandwidth occupied by the total download activity of a file from the cloud storage service via the communication
20 network, or a combination of any of these.

[78] In some non-limiting embodiments of the present technology, total download activity refers to download activity of a particular file 115 by all users (users 103, 105, 107, 109), regardless of whether the file 115 is downloaded by a user who previously uploaded the file (user 103), or by a user who received a hyperlink 138 for accessing the file 115 from another
25 user (user 107, 109), or by a user who is associated with the file by virtue of having uploaded a duplicative version of the file (user 105).

[79] In alternative embodiments, total download activity refers to download activity of a particular file only by users who received a hyperlink to the file from another user, i.e., only to download activity by users 107, 109 using hyperlink 138 which was sent to client devices
30 108, 110 via data transmittal paths 120, 126; in other words, only to download activity by users 107, 109 via the hyperlink 138. In these embodiments, total download activity does not

include downloading of the file 115 by users 103 and 105 via the data transmittal paths 118 and 124, the users 103 and 105 being users of the cloud service who have previously uploaded their respective versions of the file 115. In some embodiments, users 103 and 105 may be referred to as “registered” users of the cloud service, in contrast to users 107 and 109 who may be referred to as “public” users. As used herein, a “registered” user is intended to include users who have previously uploaded versions of the file (e.g., file 115) they are downloading. In some cases, a registered user may have subscribed or registered with a cloud storage service. As used herein, “public” users are those users who download a file (e.g., file 115) which they have not themselves uploaded, using the hyperlink 138 for accessing the file. In some cases, a public user may have subscribed or registered with a cloud storage service, although typically a public user is not a registered user or subscriber to the cloud storage service.

[80] In the embodiment of the method 200 illustrated in Figure 2, the total download activity comprises only download activity by users 107, 109 using hyperlink 138 via data transmittal paths 122, 128; such data transmittal paths are sometimes referred to herein as “public links”, and such users 107, 109 who download file 115 using data transmittal paths 122, 128 are sometimes referred to herein as “public users.” Downloading by “public users” can thus be distinguished from downloading by users who previously uploaded a particular file (i.e., user 103) or who are associated with a particular file by virtue of having uploaded a duplicative version of a file (i.e., user 105).

[81] Implementation of the hyperlink 138 is not particularly limited. In some implementations, the hyperlink 138 is an internet address for the particular file to be loaded (typically an URL or Universal Resource Locator, such as www.webpage.com or <http://yadi.sk/d/tSQaMY-IK89Ks> (depicted in Figure 4 as the hyperlink 138 in the link field 408). In some implementations, the hyperlink 138 is a reference to data composed of a word, a group of words, a string of text, or an image, that a user can click on to access a document. Implementation of the hyperlink 138 is not intended to be limited. In some implementations, the various data transmittal paths described above are used to send the hyperlink 138 from one user to another. It will be appreciated by a person of skill in the art that other implementations are possible, and any such implementation is intended to be included.

[82] Continuing in the first step 202 of the method 200 depicted in Figure 2, a first user 103 has sent the hyperlink 138 via a data transmittal path 120 for accessing a file 115 via the

communication network 102 to the second client device 108 associated with the second user 107. The file 115 is further associated with a third user 105, the third user 105 having uploaded a second file duplicative of the file 115 in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the file 115 and the third user 105 in the file-user map 114. Typically, in a cloud storage service, in order to avoid unnecessary use of storage space, administrators of the cloud server 108 try to avoid storing duplicate copies of the same file. Accordingly, when a user uploads a file, the file will undergo a deduplication process, in which the file is checked to determine whether it is duplicative of another file which is already stored on the cloud storage service.

10 If a file is found to be duplicative, then rather than storing a second copy of the same file, the user uploading the duplicative copy will simply be associated with the first copy of the file which is already stored on the cloud storage service. An entry is created in the file-user map 114 to associate the user who has uploaded the file with the file name. Deduplication systems are known in the art, such as that described in U.S. Patent Application Publication No.

15 2011/0225129. It is intended that any suitable deduplication system can be used in implementations of the present technology. In one specific embodiment of the present technology, the deduplication process uses a checksum algorithm.

[83] Thus, when the third user 105 uploads a new file (not shown) via communication network 102 to the cloud server 108, the new file is checked to determine whether it is duplicative of file 115 already stored in the cloud storage service. If the new file uploaded by the third user 105 is found not to be duplicative of file 115, then it is stored in the cloud storage service; the third user 105 can then subsequently download the new file, and can send a hyperlink for accessing the new file to other users. Alternatively, if the new file uploaded by the third user 105 is found to be duplicative of file 115 already stored in the cloud storage service, then the new file is not stored in the cloud storage service, and user 105 is associated with the file 115 using an appropriate entry in the file-user map 114; the third user 105 can then download the file 115 via the data transmittal path 124, and can send the hyperlink 138 for accessing the file 115 to client device 110 associated with the fourth user 109 via the second data transmittal path 126.

30 [84] Continuing in the first step 202 of the method 200 depicted in Figure 2, the third user 105 has sent the hyperlink 138 for accessing the file 115 via data transmittal path 126 to the fourth client device 110 associated with the fourth user 109. The fourth user 109 could then download the file 115 via data transmittal path 128 using the hyperlink 138. In some

implementations of the technology, the first user 103 and the third user 105 send the same hyperlink 138 to client devices 108 and 110, respectively, as illustrated in Figure 1. However, it should be expressly understood that in other implementations (not shown), the first user 103 and the third user 105 may send different hyperlinks to client devices 108 and 110, respectively, for accessing file 115 (or other respective files, which may be different files) via the communication network 102. In other words, a first hyperlink and a second hyperlink need not be the same, although they may be.

[85] **Step 204 – responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected**

[86] In step 204 of the method 200, a remedial action is applied to the downloading of the file 115 using the hyperlink 138 via the data transmittal path 122 and the data transmittal path 128, if the activity parameter is above a pre-determined threshold, wherein downloading of the file 115 by the first user 103 and the third user 105 via data transmittal paths 118 and 124, respectively, is not affected by the remedial action.

[87] In implementations of the technology, a remedial action is not particularly limited. The term “remedial action” is intended to include any action which regulates, reduces, lessens, slows, or in any other way controls downloading of the file 115. In some implementations, a remedial action is reducing speed of downloading activity. In some implementations, a remedial action is not allowing downloading activity, for example by removing or deactivating a button for downloading a file, removing or deactivating a button for previewing a file, or removing or blocking a data transmittal path for accessing a file. In some implementations, a remedial action comprises restricting downloading activity to between the hours of 10 pm and 6 am in the user’s local time zone. A combination of any of the foregoing may also be used. Many remedial actions for controlling, limiting or not allowing downloading are known, and any such suitable remedial actions are intended to be included. In some implementations, a remedial action may comprise denying a request from a client device 104, 106, 108, 110 to download a file 115, or alternatively, for example in the case of a media program, downloading only a version embedded with advertisements, commercials, a trailer, a highlight, or an abbreviated version of the media program to the client device 104, 106, 108, 110.

[88] In some implementations, applying a remedial action is executed at the cloud server 108. In some implementations, applying a remedial action includes generating a trigger by the cloud server 108 and sending, by the cloud server 108, the trigger via the communication network 102 to the client devices 104, 106, 108, 110; and the trigger causing the client devices 104, 106, 108, 110 to apply the remedial action to the downloading of the file 115 by the users 103, 105, 107, 109.

[89] A pre-determined threshold is not particularly limited. In some implementations, the pre-determined threshold is the file 115 being downloaded at least 100 times, the file 115 being downloaded at least 300 times, the file 115 being downloaded by at least 100 different users, the file 115 being downloaded by at least 300 different users, or at least 100 GB of bandwidth occupied by the total download activity of the file 115 from the cloud storage service via the communication network 102. A combination of any of the foregoing is also included. It is intended that any suitable pre-determined threshold may be set.

[90] In some non-limiting embodiments of the present technology, an administrator or operator associated with the cloud server 108 may set the pre-determined threshold based on an empirical review of downloading activities and patterns. Alternatively, an administrator or operator of the cloud server 108 may set the pre-determined threshold at a certain level and then amend the pre-determined threshold from time to time, based for example, on user feedback or user test groups, or on ongoing downloading activities and patterns. In some implementations, such downloading activities and patterns may be stored in the file-user map 114, for example as a flag associated with a particular file and/or user. Other related information may also be stored in the file-user map 114, typically as a flag associated with a particular file and/or user. Non-limiting examples of such information which may be stored in the file-user map 114 include: a pre-determined threshold set for a particular file, an indication that a pre-determined threshold of download activity has been reached or exceeded, status (e.g., whether or not a remedial action has been applied to a particular file), type and duration of remedial actions which have been applied in the past or are presently being applied, or a combination thereof.

[91] Reference is now made to Figure 3, which is a block diagram depicting a method 300, which illustrates another non-limiting embodiment of the present technology.

[92] Steps 302 and 304 are similar to steps 202 and 204 as described above.

[93] **Step 306 – after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter**

[94] In step 306 of the method 300, the cloud server 108 appreciates a second activity parameter. A second activity parameter may be the same or different as the activity parameter appreciated in steps 302 and 304. It should be understood that in some embodiments of the present technology, an administrator or operator associated with the cloud server 108 may choose an activity parameter based on an empirical review of downloading activities and patterns. Alternatively, an administrator or operator of the cloud server 108 may choose and set a particular activity parameter, and then amend the activity parameter to be appreciated from time to time, based for example, on user feedback or user test groups, or on ongoing downloading activities and patterns. In some implementations, an activity parameter set for a particular file and/or user may be stored in the file-user map 114, for example as a flag.

[95] Distinct activity parameters (e.g., first activity parameter, second activity parameter, etc.) can be selected independently. Similarly, a pre-determined period of time will vary, and any suitable pre-determined period of time is intended to be included. As for exact value of the pre-determined period of time, an administrator or operator associated with the cloud server 108 may choose a pre-determined period of time based on an empirical review of downloading activities and patterns, and alternatively may amend the pre-determined period of time from time to time.

[96] **Step 308 – responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user**

Step 308 is similar to other such steps, as described above. It should be understood that in embodiments of methods provided herein, separate (first, second, etc.) activity parameters, pre-determined thresholds, and remedial actions can be selected independently. In other words, a second activity parameter may be the same as or different from a first activity parameter; a second pre-determined threshold may be the same as or different from a

first pre-determined threshold; and a second remedial action may be the same as or different from a first remedial action. In each case, a parameter, threshold or action may be chosen by an administrator or operator associated with the cloud server 108, or may be set by an administrator or operator associated with the cloud server 108 and amended from time to time.

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[97] It should be expressly understood that not all technical effects mentioned herein need to be enjoyed in each and every embodiment of the present technology. For example, embodiments of the present technology may be implemented without the user enjoying some of these technical effects, while other embodiments may be implemented with the user enjoying other technical effects or none at all.

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[98] Modifications and improvements to the above-described implementations of the present technology may become apparent to those skilled in the art. The foregoing description is intended to be exemplary rather than limiting. The scope of the present technology is therefore intended to be limited solely by the scope of the appended claims.

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CLAIMS

1. A method of controlling downloading of a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service; the method comprising:
- 5 appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network;
- responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file.
- 10
2. The method of claim 1, wherein:
- the first user sends a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;
- wherein the total download activity comprises download activity via the first hyperlink and download activity by the first user; and
- 15 wherein the first remedial action is applied only to downloading of the first file via the first hyperlink, such that downloading of the first file by the first user is not affected.
3. The method of claim 2, wherein a second file is uploaded by a third client device associated with a third user via the communication network, the second file being compared after uploading to the first file using a deduplication process; wherein:
- 20 a) if the second file is not duplicative of the first file in the cloud storage service, then the second file is stored in the cloud storage service in association with the third user; or,
- b) if the second file is duplicative of the first file in the cloud storage service, then the second file is not stored in the cloud storage service, and an association is created between the first file and the third user.
- 25
4. The method of claim 3, wherein the second file was duplicative of the first file, and the third user sends a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user;
- 30 the total download activity comprises download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; and
- the first remedial action is applied only to downloading the first file via the first hyperlink and the second hyperlink, such that downloading of the first file by the first user and the third user is not affected.

5. The method of any one of claims 2 and 4, further comprising:
- after the first remedial action has been applied, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;
- responsive to the second activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.
6. The method of any one of claims 2 and 4, further comprising:
- after the first remedial action has been applied, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;
- responsive to the second activity parameter being above the pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;
- responsive to any one of the third activity parameter and the fourth activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.
7. A method of controlling downloading of a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service;
- wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;
- wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user;
- wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user;
- the method comprising:

appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user;

5 responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected.

8. The method of claim 7, further comprising:

10 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said
15 activity parameter;

responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.

9. The method of claim 7, further comprising:

20 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said
25 activity parameter;

responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;

30 responsive to any one of the third activity parameter and the fourth activity parameter being above any one of said pre-determined threshold and the second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

10. The method of any one of claims 1 to 9, wherein the server is a plurality of servers.

35 11. The method of any one of claims 1 to 10, wherein the activity parameter is the number of times the first file is downloaded.

12. The method of any one of claims 1 to 10, wherein the activity parameter is the number of different users downloading the first file.
13. The method of any one of claims 1 to 10, wherein the activity parameter is the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.
14. The method of any one of claims 1 to 10, wherein the activity parameter is a combination of at least two of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.
15. The method of any one of claims 5, 6, 8, and 9, wherein the second activity parameter is at least one of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.
16. The method of any one of claims 6 and 9, wherein the third and fourth activity parameters are independently at least one of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.
17. The method of any one of claims 1 to 11 and 14, wherein the pre-determined threshold is the first file being downloaded at least 100 times.
18. The method of claim 17, wherein the pre-determined threshold is the first file being downloaded at least 300 times.
19. The method of any one of claims 1 to 10, 12, and 14, wherein the pre-determined threshold is the first file being downloaded by at least 100 different users.
20. The method of claim 19, wherein the pre-determined threshold is the first file being downloaded by at least 300 different users.
21. The method of any one of claims 1 to 10, 13, and 14, wherein the pre-determined threshold is at least 100 GB of bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.
22. The method of any one of claims 5, 6, 8, and 9, wherein the second pre-determined threshold is at least one of the following: the first file being downloaded at least 100 times; the first file being downloaded at least 300 times; the first file being downloaded by at least 100 different users; the first file being downloaded by at least 300 different users; and at least 100 GB of bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

23. The method of any one of claims 5, 6, 8, and 9, wherein the pre-determined period of time is at least one day.
24. The method of any one of claims 5, 6, 8, and 9, wherein the pre-determined period of time is at least one week.
- 5 25. The method of any one of claims 1 to 24, wherein the first remedial action comprises reducing speed of the downloading activity.
26. The method of any one of claims 1 to 24, wherein the first remedial action comprises not allowing the downloading activity.
- 10 27. The method of any one of claims 1 to 24, wherein the first remedial action comprises restricting downloading activity to between the hours of 10 pm and 6 am in the user's local time zone.
28. The method of any one of claims 5, 6, 8, and 9, wherein the second remedial action comprises any one of reducing speed of the downloading activity, not allowing the downloading activity, and restricting downloading activity to between the hours of 10 pm and
15 6 am in the user's local time zone.
29. The method of any one of claims 1 to 28, wherein the applying the first remedial action is executed at the server.
30. The method of any one of claims 5, 6, 8, and 9, wherein the applying the second remedial action is executed at the server.
- 20 31. The method of claim 7, wherein said applying the first remedial action comprises:
- (1) generating a trigger;
- (2) sending the trigger via the communication network to the second client device and the fourth client device; and
- 25 (3) the trigger causing the second client device and the fourth client device to apply the first remedial action to the downloading of the first file by the second user and the fourth user, respectively, via the first hyperlink and the second hyperlink, respectively.
32. The method of claim 2, wherein said applying the first remedial action comprises:
- (1) generating a trigger;
- 30 (2) sending the trigger via the communication network to the second client device; and
- (3) the trigger causing the second client device to apply the first remedial action to the downloading of the first file by the second user via the first hyperlink.

33. A server configured to control downloading of a first file in a cloud storage service, the server hosting the cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; wherein the server is configured to:

appreciate an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network;

responsive to the parameter being above a pre-determined threshold, apply a first remedial action to the downloading of the first file.

34. The server of claim 33, wherein the server is further configured to apply the first remedial action only to downloading of the first file via a first hyperlink for accessing the first file via the communication network, the first hyperlink having been sent by the first user to a second client device associated with a second user; the total download activity comprising download activity via the first hyperlink and download activity by the first user; such that downloading of the first file by the first user is not affected by the first remedial action.

35. The server of any one of claims 33 and 34, wherein the server is further configured to apply the first remedial action to downloading of the first file via the first hyperlink and a second hyperlink for accessing the first file via the communication network; the second hyperlink having been sent by a third user to a fourth client device associated with a fourth user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user; the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; such that downloading of the first file by the first user and the third user is not affected by the first remedial action.

36. The server of claim 35, wherein the server is further configured to:

after the first remedial action has been applied, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

responsive to the second activity parameter being above the pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user.

37. The server of claim 35, wherein the server is further configured to:

after the first remedial action has been applied, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service

via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

5 responsive to the second activity parameter being above the pre-determined threshold, appreciate a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;

10 responsive to any one of the third activity parameter and the fourth activity parameter being above a second pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

38. A server configured to control downloading of a first file in a cloud storage service, the server hosting the cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication
15 network; the first user being one of a plurality of users associated with the cloud storage service;

wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;

20 wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user using a de-duplication process;

wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user;

25 wherein the server is configured to:

appreciate an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user;

30 responsive to the activity parameter being above a pre-determined threshold, apply a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected.

39. The server of claim 38, wherein the server is further configured to:

35 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service

via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

5 responsive to the second activity parameter being above a second pre-determined threshold, apply a second remedial action to the downloading of the first file by any one of the first user and the third user.

40. The server of claim 38, wherein the server is further configured to:

10 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciate a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

15 responsive to the second activity parameter being above the pre-determined threshold, appreciate a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;

20 responsive to any one of the third activity parameter and the fourth activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

41. The server of any one of claims 33 to 40, wherein the server is a plurality of servers.

42. The server of any one of claims 33 to 40, wherein the activity parameter is the number of times the first file is downloaded.

25 43. The server of any one of claims 33 to 40, wherein the activity parameter is the number of different users downloading the first file.

44. The server of any one of claims 33 to 40, wherein the activity parameter is the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

30 45. The server of any one of claims 33 to 40, wherein the activity parameter is a combination of at least two of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

35 46. The server of any one of claims 37, 38, 40, and 41, wherein the second activity parameter is at least one of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total

download activity of the first file from the cloud storage service via the communication network.

47. The server of any one of claims 28 and 41, wherein the third and fourth activity parameters are independently at least one of the following: the number of times the first file is downloaded, the number of different users downloading the first file, and the bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

48. The server of any one of claims 33 to 42, and 45, wherein the pre-determined threshold is the first file being downloaded at least 100 times.

49. The server of claim 48, wherein the pre-determined threshold is the first file being downloaded at least 300 times.

50. The server of any one of claims 33 to 40, 43, and 45, wherein the pre-determined threshold is the first file being downloaded by at least 100 different users.

51. The server of claim 50, wherein the pre-determined threshold is the first file being downloaded by at least 300 different users.

52. The server of any one of claims 33 to 42, 43, and 45, wherein the pre-determined threshold is at least 100 GB of bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

53. The server of any one of claims 37, 38, 40, and 41, wherein the second pre-determined threshold is at least one of the following: the first file being downloaded at least 100 times; the first file being downloaded at least 300 times; the first file being downloaded by at least 100 different users; the first file being downloaded by at least 300 different users; and at least 100 GB of bandwidth occupied by the total download activity of the first file from the cloud storage service via the communication network.

54. The server of any one of claims 37, 38, 40, and 41, wherein the pre-determined period of time is at least one day.

55. The server of any one of claims 37, 38, 40, and 41, wherein the pre-determined period of time is at least one week.

56. The server of any one of claims 33 to 52, wherein the first remedial action comprises reducing speed of the downloading activity.

57. The server of any one of claims 33 to 52, wherein the first remedial action comprises not allowing the downloading activity.

58. The server of any one of claims 33 to 52, wherein the first remedial action comprises restricting downloading activity to between the hours of 10 pm and 6 am in the user's local time zone.

59. The server of any one of claims 37, 38, 40, and 41, wherein the second remedial action comprises any one of reducing speed of the downloading activity, not allowing the downloading activity, and restricting downloading activity to between the hours of 10 pm and 6 am in the user's local time zone.
- 5 60. The server of any one of claims 33 to 59, wherein the applying the first remedial action is executed at the server.
61. The server of any one of claims 37, 38, 40, and 41, wherein the applying the second remedial action is executed at the server.
62. The server of claim 39, wherein the server is further configured to:
- 10 (1) generate a trigger; and
- (2) send the trigger via the communication network to the second client device and the fourth client device;
- the trigger causing the second client device and the fourth client device to apply the first remedial action to the downloading of the first file by the second user and the fourth user, respectively, via the first hyperlink and the second hyperlink, respectively.
- 15 63. The server of claim 34, wherein the server is further configured to:
- (1) generate a trigger; and
- (2) send the trigger via the communication network to the second client device;
- 20 the trigger causing the second client device to apply the first remedial action to the downloading of the first file by the second user via the first hyperlink.
64. A method for controlling download of a copyrighted material, the copyrighted material being found in a first file in a cloud storage service, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via a communication network; the first user being one of a plurality of users associated with the cloud storage service; the method being executable at a server hosting the cloud storage service;
- 25 wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;
- 30 wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user using a deduplication process;
- wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user;
- 35

the method comprising:

appreciating an activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user;

responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected.

65. The method of claim 64, further comprising:

after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.

66. The method of claim 64, further comprising:

after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter;

responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;

responsive to any one of the third activity parameter and the fourth activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

67. A non-transitory computer readable storage medium storing instructions, which when executed by at least one processor causes performance of:

5 appreciating an activity parameter representative of total download activity of a first file from a cloud storage service via a communication network, the first file having been uploaded to the cloud storage service by a first client device associated with a first user via the communication network; the first user being one of a plurality of users associated with the cloud storage service;

wherein the first user has sent a first hyperlink for accessing the first file via the communication network to a second client device associated with a second user;

10 wherein the first file is further associated with a third user, the third user having uploaded a second file duplicative of the first file in the cloud storage service, such that the second file was not stored in the cloud storage service and an association was created between the first file and the third user using a deduplication process;

wherein the third user has sent a second hyperlink for accessing the first file via the communication network to a fourth client device associated with a fourth user;

15 the total download activity comprising download activity via the first hyperlink and the second hyperlink and download activity by the first user and the third user; and,

responsive to the activity parameter being above a pre-determined threshold, applying a first remedial action to the downloading of the first file via the first hyperlink and the second hyperlink, wherein downloading of the first file by the first user and the third user is not affected.

20 68. The computer readable storage medium of claim 67, which when executed by at least one processor further causes performance of:

25 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter being implemented at a pre-determined period of time after said appreciating of said activity parameter; and,

30 responsive to the second activity parameter being above a second pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user.

69. The computer readable storage medium of claim 67, which when executed by at least one processor further causes performance of:

35 after the first remedial action has been applied to the downloading of the first file via the first hyperlink and the second hyperlink, appreciating a second activity parameter representative of total download activity of the first file from the cloud storage service via the communication network, the appreciating of the second activity parameter

being implemented at a pre-determined period of time after said appreciating of said activity parameter;

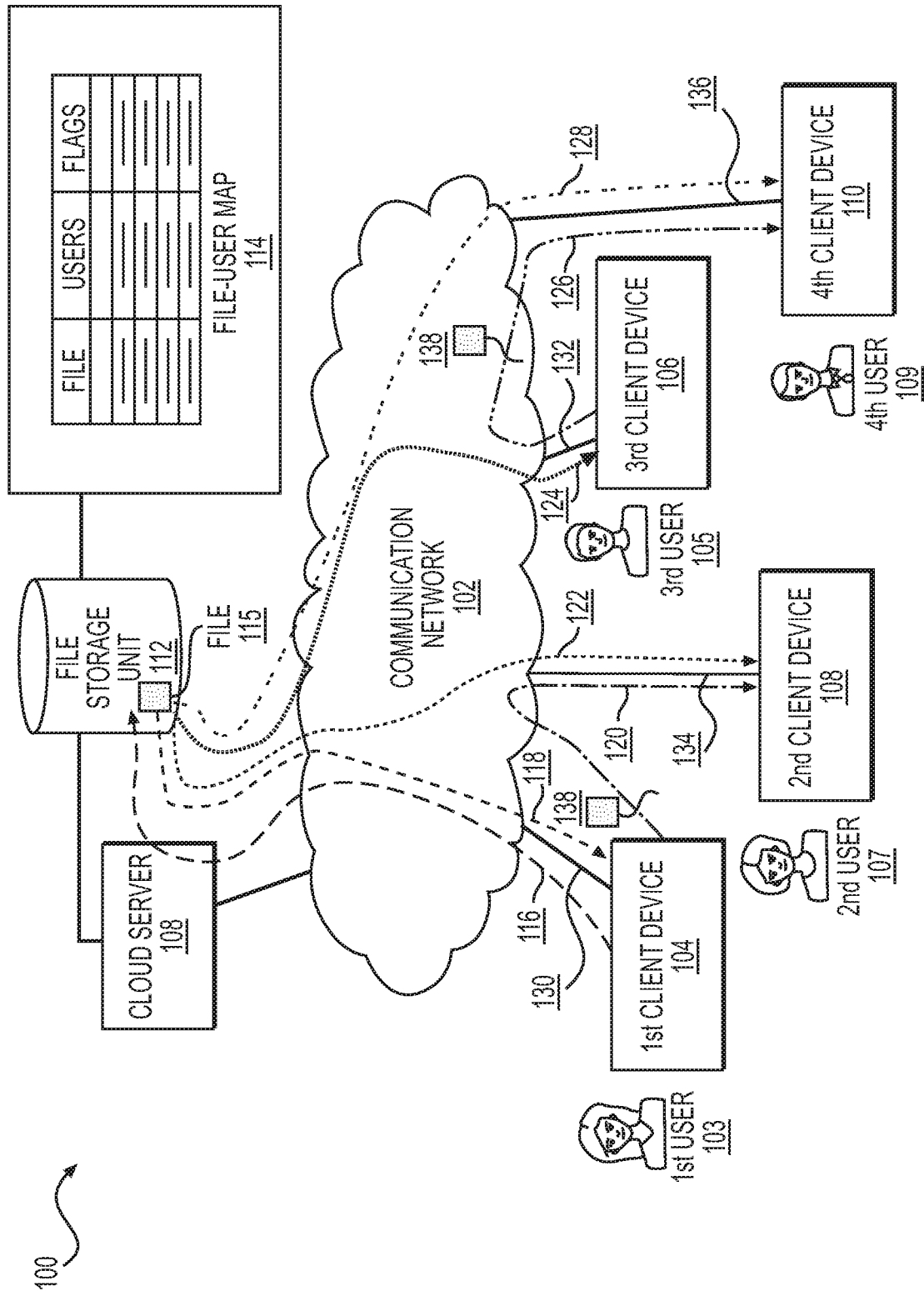
5 responsive to the second activity parameter being above a second pre-determined threshold, appreciating a third activity parameter and a fourth activity parameter representative of download activity of the first file from the cloud storage service via the communication network by the first user and the third user, respectively;

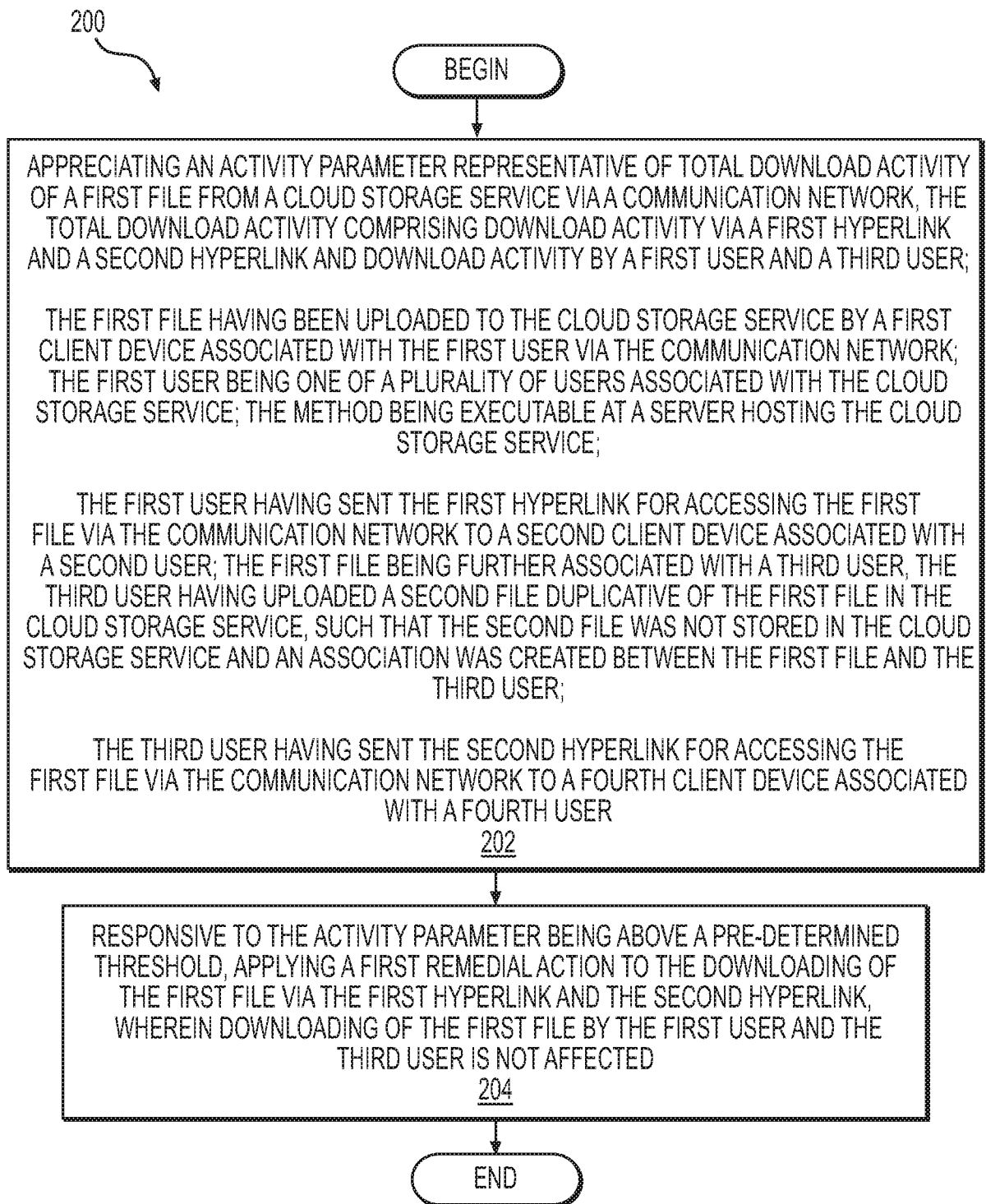
10 responsive to any one of the third activity parameter and the fourth activity parameter being above the pre-determined threshold, applying a second remedial action to the downloading of the first file by any one of the first user and the third user, respectively.

70. The method of any one of claims 4 to 31 and 64 to 66, wherein the first hyperlink and the second hyperlink are the same.

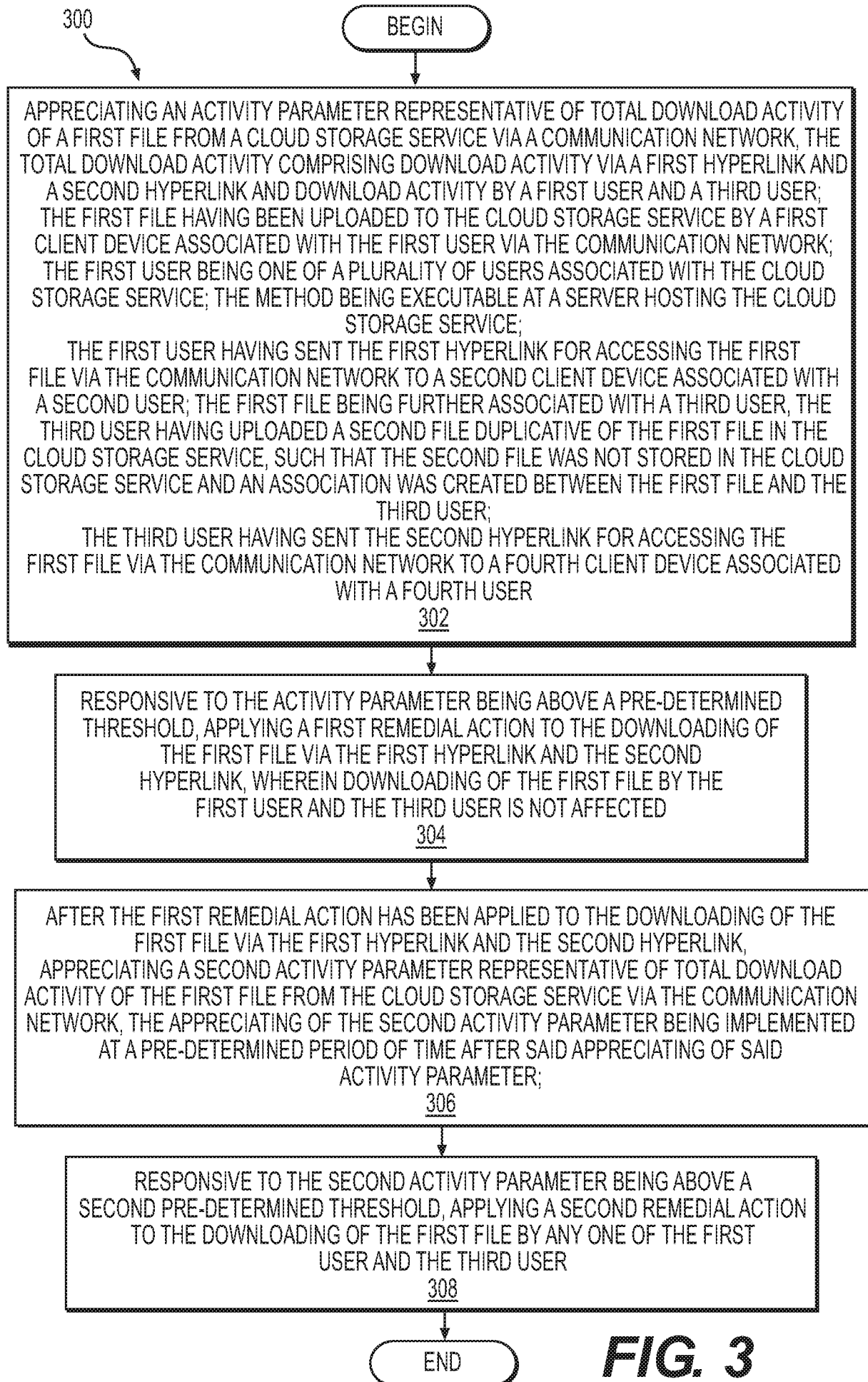
71. The server of any one of claims 36 to 62, wherein the first hyperlink and the second hyperlink are the same.

15 72. The computer readable storage medium of any one of claims 67 to 69, wherein the first hyperlink and the second hyperlink are the same.



**FIG. 2**

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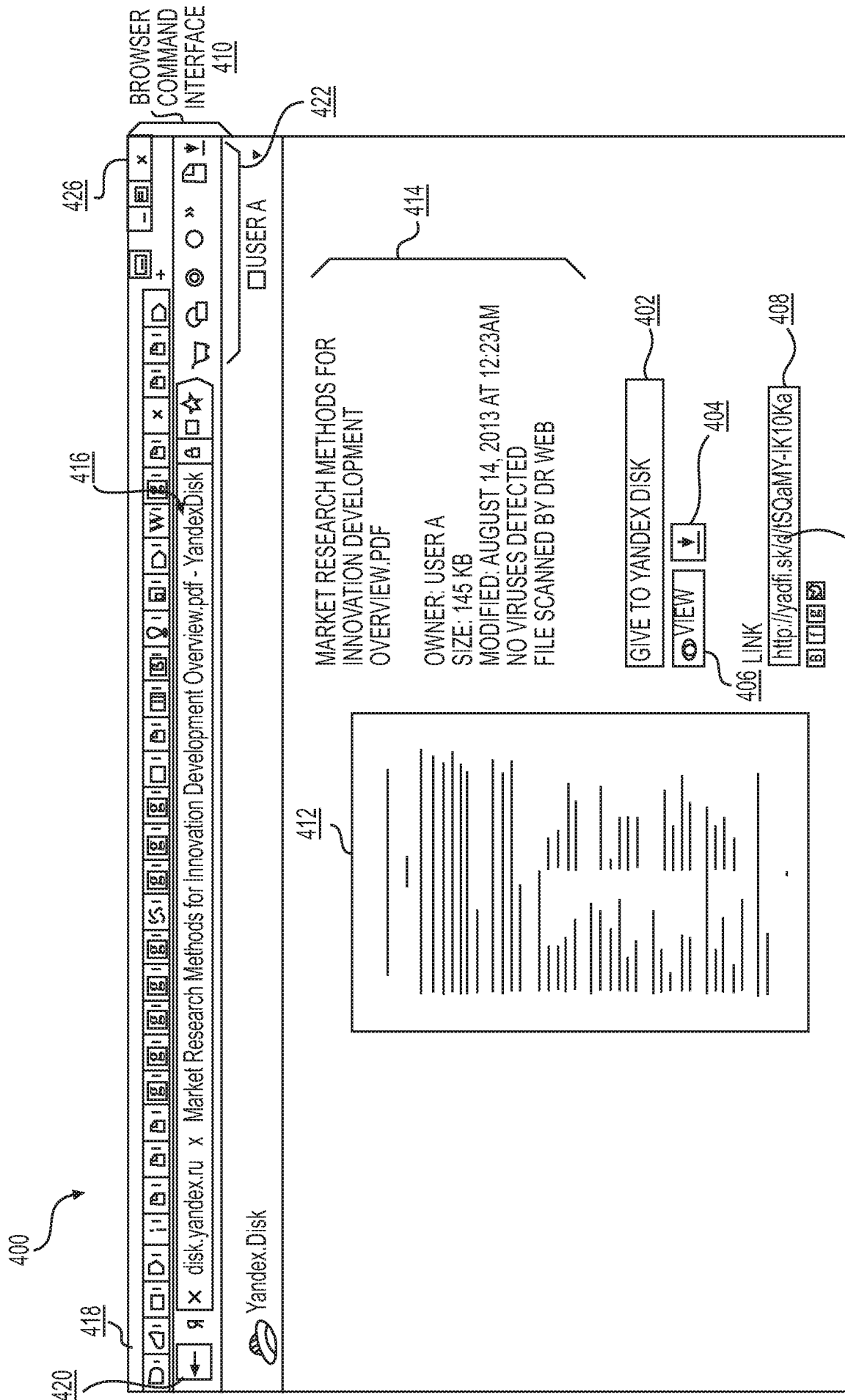


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/064634

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L 29/08 (2014.01)

CPC - G06F 21/6218 (2014.11)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - H04L 29/08, H04L 29/06, G06F 15/173 (2014.01)

USPC - 709/219, 224, 713/153

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G06F 21/6218, H04L 67/1002, H04L 67/10 (2014.11) (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Orbit, Google Patents, Google.

Search terms used: hyperlinks, controlling, downloads, cloud, servers, deduplication, users.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US 2014/0052825 A1 (LUECKE et al) 20 February 2014 (20.02.2014) entire document	1, 33
Y		2-9, 31-32, 34-40, 62-69, 72
Y	US 2013/0305039 A1 (GAUDA) 14 November 2013 (14.11.2013) entire document	2-9, 31-32, 34-40, 62-69, 72
A	US 2013/0219050 A1 (PARK et al) 22 August 2013 (22.08.2013) entire document	1-9, 31-40, 62-69, 72
A	US 2012/0110005 A1 (KUO et al) 3 May 2012 (3.05.2012) entire document	1-9, 31-40, 62-69, 72

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 January 2015

Date of mailing of the international search report

03 FEB 2015

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2014/064634

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: 10-30, 41-61, 70, 71
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.