

CODELESS SHARING OF SPREADSHEET OBJECTS

BACKGROUND

5 [0001] Many people utilize spreadsheets to interact with data. A user typically arranges the data in a desired configuration within one or more spreadsheet workbook. Sharing this information, however, can be a cumbersome process. For example, copies of the workbook or portions of the workbook may need to be made and emailed to other users, permissions may need to be set up, the copies may not reach all of the intended recipients, and multiple copies may result in inconsistent data.

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SUMMARY

[0002] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

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[0003] A user interface that when selected triggers the automatic sharing of a spreadsheet object in a spreadsheet with a chosen network service (e.g. social network, blog, or some other network location). For example, cells, tables, pivot tables, charts and other objects of the spreadsheet may be selected to be shared using the user interface.

When a spreadsheet object is selected and indicated to be shared using the user interface, 20 the spreadsheet is automatically saved to a network share, permissions are set for the spreadsheet to share the spreadsheet object, and the spreadsheet object is shared with the chosen network service. For example, a user may share a chart with a social networking site by right clicking on the chart within the spreadsheet and selecting the option to share the chart with the social networking site. Changes made to the spreadsheet after the 25 spreadsheet object is shared may be reflected in the spreadsheet object on the network service.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIGURE 1 illustrates an exemplary computing environment;

30 [0005] FIGURE 2 shows a system for codeless sharing of spreadsheet objects with a network service;

[0006] FIGURE 3 shows a spreadsheet comprising different spreadsheet objects that may be shared; and

[0007] FIGURE 4 illustrates a process for sharing a spreadsheet object in a spreadsheet.

DETAILED DESCRIPTION

[0008] Referring now to the drawings, in which like numerals represent like elements, various embodiment will be described. In particular, FIGURE 1 and the corresponding discussion are intended to provide a brief, general description of a suitable computing environment in which embodiments may be implemented.

[0009] Generally, program modules include routines, programs, components, data structures, and other types of structures that perform particular tasks or implement particular abstract data types. Other computer system configurations may also be used, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like. Distributed computing environments may also be used where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

[0010] Referring now to FIGURE 1, an illustrative computer environment for a computer 100 utilized in the various embodiments will be described. The computer environment shown in FIGURE 1 includes computing devices that each may be configured as a server, a desktop or mobile computer, or some other type of computing device and includes a central processing unit 5 ("CPU"), a system memory 7, including a random access memory 9 ("RAM") and a read-only memory ("ROM") 10, and a system bus 12 that couples the memory to the central processing unit ("CPU") 5.

[0011] A basic input/output system containing the basic routines that help to transfer information between elements within the computer, such as during startup, is stored in the ROM 10. The computer 100 further includes a mass storage device 14 for storing an operating system 16, spreadsheet 11, spreadsheet application 24, other program modules 25, and sharing manager 26 which will be described in greater detail below.

[0012] The mass storage device 14 is connected to the CPU 5 through a mass storage controller (not shown) connected to the bus 12. The mass storage device 14 and its associated computer-readable media provide non-volatile storage for the computer 100. Although the description of computer-readable media contained herein refers to a mass storage device, such as a hard disk or CD-ROM drive, the computer-readable media can be any available media that can be accessed by the computer 100.

[0013] By way of example, and not limitation, computer-readable media may comprise computer storage media and communication media. Computer storage media includes

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 media includes, but is not limited to, RAM, ROM, Erasable Programmable Read Only Memory (“EPROM”),
5 Electrically Erasable Programmable Read Only Memory (“EEPROM”), flash memory or other solid state memory technology, CD-ROM, digital versatile disks (“DVD”), or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer 100.

10 **[0014]** Computer 100 operates in a networked environment using logical connections to remote computers through a network 18, such as the Internet. The computer 100 may connect to the network 18 through a network interface unit 20 connected to the bus 12. The network connection may be wireless and/or wired. The network interface unit 20 may also be utilized to connect to other types of networks and remote computer systems. The
15 computer 100 may also include an input/output controller 22 for receiving and processing input from a number of other devices, including a keyboard, mouse, or electronic stylus (not shown in FIGURE 1). Similarly, an input/output controller 22 may provide input/output to an IP phone, a display screen 23, a printer, or other type of output device.

[0015] As mentioned briefly above, a number of program modules and data files may be
20 stored in the mass storage device 14 and RAM 9 of the computer 100, including an operating system 16 suitable for controlling the operation of a computer, such as WINDOWS SERVER® or the WINDOWS 7® operating system from MICROSOFT CORPORATION of Redmond, Washington. The mass storage device 14 and RAM 9 may also store one or more program modules. In particular, the mass storage device 14 and the
25 RAM 9 may store one or more application programs, including a spreadsheet application 24 and program modules 25. According to an embodiment, the spreadsheet application 24 is the MICROSOFT EXCEL spreadsheet application. Other spreadsheet applications may also be used.

[0016] Sharing manager 26 is configured to allow the sharing of one or more
30 spreadsheet objects within a spreadsheet. Sharing manager 26 may be located externally from spreadsheet application 24 as shown or may be a part of spreadsheet application 24. Further, all/some of the functionality provided by sharing manager 26 may be located internally/externally from spreadsheet application 24.

[0017] A user interface, such as sharing menu 28, allows a user to select one or more spreadsheet objects to share with a network service. When a user selects a spreadsheet object to share using sharing menu 28, sharing manager 26 performs operations to automatically permission and share the spreadsheet object with the chosen network service 17 (e.g. social network, blog, or some other network location). For example, cells, tables, charts and other objects of the spreadsheet may be selected to be shared using the sharing menu 28 user interface. When the spreadsheet object is selected and indicated to be shared using the user interface, the sharing manager saves the spreadsheet a network share, such as network share 27, permissions are set for the spreadsheet to share the spreadsheet object, and the spreadsheet object is shared to network service 17. For example, a user may share a chart to a social networking site by selecting sharing menu 28 associated with spreadsheet application 24 and selecting the option to share the chart on the social networking site. The spreadsheet stored on network share 27 is connected to the network service 17 and computing device 100 such that changes made to the spreadsheet after the spreadsheet object is shared are optionally reflected in the spreadsheet object on network service 17.

[0018] FIGURE 2 shows a system for codeless sharing of spreadsheet objects with a network service. As illustrated, system 200 includes computing device 1 (210), computing device 2 (220), network share 230, spreadsheet server 240 and network service 250.

[0019] The computing devices may be any type of computing device that is configured to perform the operations relating to the sharing of one or more spreadsheet objects with a network service. For example, some of the computing devices may be: mobile computing devices (e.g. cellular phones, tablets, smart phones, laptops, and the like); desktop computing devices and servers. Some computing devices may be arranged to provide an online cloud based service (e.g. interacting with spreadsheets online), some may be arranged as data shares, some may be arranged in local networks, some may be arranged in networks accessible through the Internet, and the like.

[0020] The computing devices are coupled through network 18. Network 18 may be many different types of networks. For example, network 18 may be an IP network, a carrier network for cellular communications, and the like. Generally, network 18 is used to transmit data between computing devices, such as computing device 1, computing device 2, network share 230, spreadsheet server 240 and network service 250.

[0021] Computing device 1 includes spreadsheet application 212, spreadsheet 214 and user interface 216. As illustrated, computing device 1 is used by a user to select one or

more objects to share with a network service, such as network service 250. The network service may be a social networking site, a blog, a web page hosted by a service, or some other network location.

[0022] Spreadsheet 214 comprises different cells/spreadsheet objects that may be selected for sharing with a network service. The spreadsheet object may be any data/object within the spreadsheet. For example, cells, tables, charts and other objects of the spreadsheet may be selected for sharing.

[0023] Sharing user interface (UI) 216 is used to select one or more spreadsheet objects/cells within spreadsheet 214 to share. One or more user interfaces of one or more types may be used to share a spreadsheet object. For example, UI 216 may be a context menu, a menu within a menu bar, a menu item selected from a ribbon user interface, a graphical menu, and the like. Generally, UI 216 is configured such that a user may easily share the selected spreadsheet object(s) to the network service, such as a social networking site. When the sharing option is selected within user interface 216, zero or more options may be presented to the user before the selected spreadsheet object is shared to the network service. For example, a user may simply select an option within UI 216 such as “Share to Social Networking Site X” to share the spreadsheet object with Networking Site X. Other options that are associated with sharing the spreadsheet object may be automatically set and/or set at a different time. For example, a default set of sharing permissions may be set, the service(s) to share the spreadsheet object(s) may be selected, and the like. A user may also be presented with user interface elements that selects these options after invoking UI 216.

[0024] After the spreadsheet object within spreadsheet 214 is selected for sharing, sharing manager 26 automatically saves all/portion of spreadsheet 214 to a network share, such as network share 230. For example, the entire spreadsheet workbook may be saved to network share 230 or only a portion of the spreadsheet workbook may be saved to the network share. The saving of spreadsheet 214 occurs automatically. Network share 230 is accessible by the computing devices that interact with spreadsheet 214 and/or spreadsheet object 232. The network share may be associated with an online service that supports online access/interaction with the spreadsheet and spreadsheet objects. For example, spreadsheet server 240 may be configured as an online service to provide online users with the ability to interact/modify spreadsheets. The network service with which the spreadsheet object is shared may also access the object on the network share. According to another embodiment, the spreadsheet object is stored on the chosen network service.

[0025] Computing device 2 includes one or more applications, such as web browser 222 and application 224 that may be configured to view/enter/interact with data that is associated with spreadsheet 214 and/or spreadsheet object 232 that is linked to a spreadsheet, such as spreadsheet 214 on network share 230. For example, web browser 222 may be used to access a social networking site that includes a shared spreadsheet object, such as shared spreadsheet object 232. Similarly, application 224 may be configured to view/enter/interact with data that is associated with spreadsheet 214 and/or spreadsheet object 232.

[0026] Spreadsheet server 240 includes web application 242 that comprises spreadsheet web renderer 244. According to an embodiment, spreadsheet server 240 is configured as a server that is located within an online service that is configured to provide services relating to displaying an interacting with spreadsheets. Web application 242 is configured for receiving and responding to requests relating to spreadsheet documents. For example, spreadsheet server 240 may access spreadsheet 214 or spreadsheet object 232 stored on network share 230. Web application 242 is operative to provide an interface to a user of a computing device, such as computing device 2, to interact with a spreadsheet accessible via network 18. Web application 242 may communicate with a spreadsheet calculation server that is used for retrieving and calculating spreadsheets, such as the spreadsheet 214 stored at network share 230.

[0027] Spreadsheet server 240 receives requests from computing devices, such as network service 250 and/or computing device 2. The computing device 2 or network service 250 may transmit a request to spreadsheet server 240 to view the shared spreadsheet object 232 within the context of the Web browser application, such as Web browser 222 on computing device 2. In response to such a request, the Web application 242 obtains the spreadsheet/spreadsheet object from network share 230, based on whether the user has permissions to the spreadsheet/object. The portion of the spreadsheet to display (based on the selected object(s) is converted into a markup language format, such as the ISO/IEC 29500 format. The spreadsheet may be converted by spreadsheet server 240 or by one or more other computing devices. Once the Web application 242 has received the markup language representation of the spreadsheet, the spreadsheet server utilizes the spreadsheet Web renderer 244 to convert the markup language formatted spreadsheet into a representation of the spreadsheet that may be rendered by a Web browser application, such as Web browser 222 on computing device 2. The rendered spreadsheet object appears substantially similar to the output of the spreadsheet

application 212 on computing device 1 when utilized to view the same spreadsheet object. Once the spreadsheet Web renderer 244 has completed rendering the file, it is returned by the spreadsheet server 240 to the requesting computing device, such as computing device 2, where it may be rendered by the Web browser 222.

5 **[0028]** The spreadsheet Web renderer 244 is also configured to render into the markup language file one or more scripts for allowing the user of a computing device, such as computing device 2 to interact with the spreadsheet object within the context of the Web browser 22. Spreadsheet Web renderer 244 is operative to render script code that is executable by the Web browser application 222 into the returned Web page. The scripts
10 may provide functionality, for instance, for allowing a user to change a view of the spreadsheet object and/or to modify values that are related to the spreadsheet object. In response to certain types of user input, the scripts may be executed. When a script is executed, a response may be transmitted to the spreadsheet server 240 indicating a spreadsheet object within the spreadsheet that has been acted upon, to identify the type of
15 interaction that was made, and to further identify to the Web application 242 the function that should be performed upon the appropriate spreadsheet object.

[0029] The permissions associated with the spreadsheet object(s) shared with network service 250 are used to allow/restrict users from viewing/interacting with the shared objects. For example, the permissions may specify a list of users that may view and
20 interact with the spreadsheet and another group of users that may only view the spreadsheet objects. The list of users may be determined using information from the network service on which the spreadsheet object is shared. For example, a user's group of friends on a social networking site may be allowed to always view/interact with a shared spreadsheet object unless a user is specifically excluded. Other lists may also be searched
25 to determine authorized users (e.g. contact lists, Instant Messaging Lists, recent addressees of emails, a favorites list, and the like). Alternatively a user may specify/select the permissions and users that may view/interact with the shared spreadsheet object using UI 216. According to an embodiment, the network service specifies the permissions to be applied to the shared object. The permissions may be stored in network share 230 and/or
30 in some other location (e.g. spreadsheet server 240 or network service 250). In addition to restricting the users ability to view/interact with the shared object, the permissions may also restrict access to other portions of the spreadsheet on network share 230 from being provided to the network service. For example, while an entire spreadsheet may be stored on network share 230 and used by spreadsheet server 240 for performing operations on the

shared spreadsheet object, only the shared spreadsheet objects are viewable/interact able through network service 250.

[0030] FIGURE 3 shows a spreadsheet comprising different spreadsheet objects that may be shared. As illustrated spreadsheet 300 shows different user interfaces, menus, and
5 spreadsheet objects including cell 301, row 302, column 303, table 304, formula 305 and list 306. While only one object of each type is shown, more or fewer objects may be included within spreadsheet 300. Other types of objects may also be included within spreadsheet 300 that may be selected to be shared.

[0031] Spreadsheet 300 includes a grid having rows and columns. The columns and
10 rows define the workspace for the currently selected workbook. Each of the cells defined by a particular row and column combination can be edited with numerical or text data and commands may be performed on the various cells to perform virtually unlimited types of analysis operations.

[0032] Spreadsheet 300 also includes various user interface elements for navigating
15 within the currently selected spreadsheet or within other spreadsheets within the currently selected workbook. Spreadsheet 300 also shows exemplary user interfaces that may be used for sharing one or more spreadsheet objects, such as menu 320, menu 322 and menu 324. Menu 320 is a menu that is contained within menu bar 330. When menu 320 is selected various sharing options are available to be selected. The sharing options may
20 comprise a variety of options, such as sharing to a specific network service (e.g. "Share to Site 1"), selecting a site to share one or more spreadsheet objects, permission options, and other options. For example, the other options may include options to select spreadsheet objects to share. When a user selects the sharing option, the selected spreadsheet object(s) is automatically shared to the chosen network service. A context menu may also be used
25 to receive the sharing options. For example, a user may right click on Table 304 which displays context menu 322. The user may then select the sharing options to have Table 304 shared with the chosen network service. Web page 380 illustrates Table 304 shown within a web page of the network service. A user may view/interact with Table 304 through the network service and any changes made to the spreadsheet that affect Table
30 304 are reflected in the shared Table 304. As can be seen, the sharing process of an object may be as simple for a user as selecting a single menu option. The sharing options may also be presented in other manners. For example, a menu bar 324 may show graphical icons (e.g. share 326, permission 328) that allows a user to select the sharing options.

Shortcuts may also be provided (e.g. a key or combination of keys) to select the sharing menu/options.

[0033] Referring now to FIGURE 4 an illustrative process for sharing a spreadsheet object in a spreadsheet will be described. When reading the discussion of the routines presented herein, it should be appreciated that the logical operations of various embodiments are implemented (1) as a sequence of computer implemented acts or program modules running on a computing system and/or (2) as interconnected machine logic circuits or circuit modules within the computing system. The implementation is a matter of choice dependent on the performance requirements of the computing system implementing the invention. Accordingly, the logical operations illustrated and making up the embodiments described herein are referred to variously as operations, structural devices, acts or modules. These operations, structural devices, acts and modules may be implemented in software, in firmware, in special purpose digital logic, and any combination thereof.

[0034] After a start block, process 400 moves to operation 410, where a spreadsheet object is selected within a spreadsheet for sharing. One or more spreadsheet objects/cells may be selected for sharing. For example, a table and a chart may be selected, a single cell may be selected, two tables may be selected, and the like.

[0035] Moving to block 420, the user interface for sharing is displayed. The user interface may be displayed before block 410 or after the spreadsheet object is selected and/or at other times during the sharing process. Different types of UIs may be used to share/select a spreadsheet object, such as but not limited to, a context menu, a menu within a menu bar, an icon based menu, a stand-alone menu, a shortcut key, and the like may be used to share a spreadsheet object. For example, a user may select a spreadsheet object within the spreadsheet and then right click to bring up a context menu that presents one or more options to share the spreadsheet object.

[0036] Flowing to operation 430, the selected spreadsheet/spreadsheet object to share is automatically saved to a network share. For example, a spreadsheet/spreadsheet object on a local computing device may be saved to a network share. According to an embodiment, the entire spreadsheet containing the spreadsheet object is saved to the network share. The network share may be associated with the network service that is selected to share the object with and/or may be associated with another online service. For example, the network share may be associated with an online spreadsheet service.

[0037] Transitioning to operation 440, a connection is created between the network share, the spreadsheet object on the computing device sharing the spreadsheet object and the network service. The connection is used to help ensure that changes made to the spreadsheet that affect the shared spreadsheet object are updated in the shared object. For example, if a user on the computing device that initially shared the object updates the shared object, the updates may be reflected to a user viewing the shared object on the network service. Similarly, when a user interacts with the shared spreadsheet object on the network service, changes may be reflected in the original spreadsheet on the user's computer who shared the spreadsheet object.

10 [0038] Flowing to operation 450, permissions are set for the spreadsheet. The permissions associated with the shared spreadsheet object(s) are used to allow/restrict users from viewing/interacting with the spreadsheet and the shared spreadsheet object(s). Some/all of the permissions may be manually or automatically set. For example, the permissions restricting viewing of only the shared spreadsheet object may be set
15 automatically such that only the shared spreadsheet objects are viewable on the network service. In this way, the users interacting/viewing the spreadsheet object through the network service do not have access to the parts of the spreadsheet that are not shared. The permissions limiting the users to view the spreadsheet may be manually set. For example, a user may enter/select the group of users that are allowed to view/interact with the
20 spreadsheet object. The permissions may be set when selecting the spreadsheet object for sharing and/or at some other time. For example, a user may set permissions on the network service and the network service may send the permissions to the service enforcing the permissions (i.e. a spreadsheet server).

[0039] Moving to operation 460, the spreadsheet object is shared with the network service. The sharing may occur using different methods. For example, a link may be provided to the network service, a markup language rendering may be embedded on a page of the network service, the spreadsheet/spreadsheet object may be provided to the network service, and the like.

[0040] Transitioning to optional operation 470, the users with whom the spreadsheet object has been shared with may be notified of the sharing. The notification may be made using one or more notification methods. For example, a social network may send a sharing notification message, the spreadsheet application may send a message to the users, and the like.

[0041] Flowing to operation 480, the spreadsheet object is displayed through the network service. According to an embodiment, only the spreadsheet object that is shared is displayed and the other portions of the spreadsheet are not displayed to the user(s) of the network service. Updates to the spreadsheet object may be made through the network
5 service and/or through other computing devices. The process then flows to an end block and returns to processing other actions.

[0042] The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. Since many embodiments of the invention can be made without departing from the spirit and scope of the invention, the
10 invention resides in the claims hereinafter appended.

WHAT IS CLAIMED IS:

1. A method for sharing a spreadsheet object that is contained within a spreadsheet to a network service, comprising:
 - selecting the spreadsheet object within the spreadsheet to share on the
 - 5 network service; wherein the spreadsheet object is selected on a first computing device;
 - automatically saving the spreadsheet object from the first computing device to a network share, wherein the network share is at a different location from the first computing device and the network service;
 - creating a connection to the spreadsheet object from the network service to
 - 10 the network share; and
 - sharing the spreadsheet object with the network service; wherein the selected spreadsheet object can be interacted with and viewed through the network service.
2. The method of Claim 1, further comprising determining when a change is made to the spreadsheet that affects the spreadsheet object after the spreadsheet object is
- 15 shared with the network service and automatically updating the spreadsheet object on the network service.
3. The method of Claim 1, wherein the network service is at least one of a social network, a blog and an Internet site.
4. The method of Claim 1, wherein selecting the spreadsheet object within the
- 20 spreadsheet to share on the network service comprises displaying a user interface comprising a sharing option that when selected automatically shares the spreadsheet object to the network service.
5. The method of Claim 1, further comprising setting permissions to restrict viewing to only the selected spreadsheet object within the spreadsheet on the network
- 25 service.
6. The method of Claim 1, wherein sharing the spreadsheet object to the network service comprises at least one of: embedding a link to the shared spreadsheet object; embedding a representation of the shared spreadsheet object within a page of the network service.
- 30 7. A computer-readable storage medium storing computer-executable instructions for sharing a spreadsheet object that is contained within a spreadsheet to a network service, comprising:
 - selecting the spreadsheet object on a first computing device within the spreadsheet to share on the network service;

displaying a user interface comprising a sharing option that when selected automatically shares the selected spreadsheet object to the network service;

automatically saving the spreadsheet object from the first computing device to a network share, wherein the network share is at a different location from the
5 first computing device and the network service;

creating a connection to the spreadsheet object from the network service to the network share;

sharing the spreadsheet object with the network service; wherein the selected spreadsheet object can be interacted with and viewed through the network
10 service; and

determining when a change is made to the spreadsheet that affects the spreadsheet object after the spreadsheet object is shared with the network service and automatically updating the spreadsheet object on the network service.

8. The computer-readable storage medium of Claim 7, further comprising
15 automatically setting permissions to restrict viewing to only the selected spreadsheet object within the spreadsheet on the network service and wherein sharing the spreadsheet object to the network service comprises at least one of: embedding a link to the shared spreadsheet object; embedding a representation of the shared spreadsheet object within a page of the network service.

20 9. A system for sharing a spreadsheet object that is contained within a spreadsheet to a network service, comprising:

a network connection that is configured to connect to a network;
a processor, memory, and a computer-readable storage medium;
an operating environment stored on the computer-readable storage medium
25 and executing on the processor;

a spreadsheet application;
a spreadsheet; wherein the spreadsheet comprises spreadsheet objects; and
a sharing manager operating in conjunction with the spreadsheet
application that is configured to perform actions comprising:

30 selecting the spreadsheet object within the spreadsheet to share on the network service; wherein the spreadsheet object is selected on a first computing device; wherein the network service is at least one of: a blog, a social network, and an Internet site;

displaying a user interface comprising a sharing option that when selected automatically shares the selected spreadsheet object to the network service;

5 automatically saving the spreadsheet object from the first computing device to a network share, wherein the network share is at a different location from the first computing device and the network service;

creating a connection to the spreadsheet object from the network service to the network share; and

10 sharing the spreadsheet object with the network service; wherein the selected spreadsheet object can be interacted with and viewed through the network service.

10. The system of Claim 9, further comprising:

15 determining when a change is made to the spreadsheet that affects the spreadsheet object after the spreadsheet object is shared with the network service and automatically updating the spreadsheet object on the network service; and

automatically setting a portion of the permissions that restrict viewing to only the selected spreadsheet object within the spreadsheet on the network service and receiving a selection of users that are allowed to interact with the shared spreadsheet object on the network service.

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