

As can be seen in FIG. 7B, the advanced option dialog box 980 includes a frame 982, option boxes 985, an entry window 990 and selection buttons 995. The option boxes 985 in the advance option dialog box 980 provide the user with the options to “allow changes by more than one user at the same time” and/or “to keep the change history for a specified amount of days.” The specific amount of days for which the change history is to be stored is input by the user by entering the number of days into the entry window 990. The selection buttons 995 are comprised of: “OK” and “Cancel”. Once the desired option boxes 985 are chosen, the user confirms the choices by engaging the “OK” selection button 995.

It is important to note, however, that the user(s) that was/were manually removed will still have a local copy 65 of the document and a local copy 67 of the record file in the resident memory of the user’s respective remote computer 49. Hence, the manually removed user(s) can still attempt to save edits made to the local copy 65 of the document. Should the user(s) attempt to save any edits, as illustrated at step 925, the user(s) record file(s) will be recreated in the MCF 100 by inserting the duplicate local copy 67 of the record file located in the resident memory of the user’s respective remote computer 49 as illustrated at step 930. Once the appropriate duplicate local copy 67 of the record file(s) for the respective user(s) has/have been inserted into the MCF 100, the MCF 100 proceeds with normal operation.

SUMMARY OF THE DETAILED DESCRIPTION

From the foregoing description, it will be appreciated that the present invention provides a system for the simultaneous, multi-user editing of a document stored on a shared disk. In an embodiment of the present invention, a plurality of users can access a master copy 60 stored in system memory 22 of the file server 20, make various edits thereto, and save the edits over the master copy 60 thereby maintaining an updated master copy 60 that reflects the latest edits saved by the plurality of users.

The simultaneous, multi-user editing of the present invention incorporates the use of the multi-user control file 100 (MCF) having individual record files 66, 86, and 96 associated with the master copy 60 and with each user that is accessing the master copy 60. The MCF 100 facilitates the control of the timing of the saving actions and the tracking of the various versions of local copies 65. The word processing program module 36a (WP) of the present invention provides for the reconciling of the master copy 60 with the local copies 65, as well as detection and resolution of conflicts that may arise during the reconciliation procedure. During the reconciliation procedure, the Wp 36a locks the MCF 100 to prevent any other user from accessing and saving to the master copy 60.

In another aspect of the present invention, relating to the resolution of conflicts, a “Conflict Dialog Box” displays the individual conflicts to the user and requires the user to either “accept” or “reject” each conflict until all the conflicts have been resolved before the edits to the master copy 60 are saved. During the conflict resolution procedure, the WP 36a unlocks the MCF 100 to once again allow other users to access and save edits to the master copy 60.

In yet another aspect of the present invention, the word processing program module 36a can automatically recover from a system failure by reconstructing the MCF 100 from the duplicate local record files 67 and synchronizing the master copy 60 with the local copies 65 of each user. The reconstructing of the MCF 100 is accomplished by matching

the user record files, for example 86 and 96, located in the MCF 100 to the users’ local copies 67 located on the remote computers 49 of the respective users.

In yet another aspect of the present invention, the word processing module 36a provides for the manual removal of a user from the MCF 100. The capability to manually remove a user is necessary to clean up the MCF 100 when a user leaves a remote computer 49 without closing the local copy 65 of the document that was being edited. Therefore, when the last user has closed their respective local copy 65 of the document, the MCF 100 is cleared from the file server 20.

The foregoing system may be conveniently implemented in a program module that is based upon the flow charts in FIGS. 2A–G and 4–5 as well as the illustrations in FIGS. 3, 6, 7A and 7B. No particular programming language has been required for carrying out the various procedures described above because it is considered that the operations, steps, and procedures described above and illustrated in the accompanying drawings are sufficiently disclosed to permit one of ordinary skill in the art to practice the present invention. Moreover, there are many computers and operating systems which may be used in practicing the present invention and therefore no detailed computer program could be provided which would be applicable to all of these many different systems. Each user of a particular computer will be aware of the language and tools which are most useful for that user’s needs and purposes.

The present invention has been described in relation to particular embodiments which are intended in all respects to be illustrative rather than restrictive. The particular embodiment described is one of creating a multi-user control file to be associated with the master copy document, creating a local copy document for the user to edit, assigning version identifier numbers to the documents, tracking the version identifiers and coordinating the various saving actions by the users so as to facilitate maintaining an updated master copy document that reflects the latest edits saved by a user. However, those skilled in the art will understand that the principles of the present invention apply to any tasks or processes that require simultaneous multi-user access to a document or file for multi-user use.

Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description.

What is claimed is:

1. A computer-implemented method for simultaneous, multi-user editing of a document stored in a memory shared by a plurality of users, comprising the steps of:
 - a. creating a multi-user control file in the shared memory that is associated with a master copy of the document when a first user of the plurality of users accesses the document in the shared memory from a local computer;
 - b. assigning the master copy of the document a master copy version identifier number when the first user of the plurality of users accesses the document in the shared memory;
 - c. creating a local copy of the document for editing by each user on each user’s local computer, which first local copy duplicates the master copy, when each user of the plurality of users accesses the document in the shared memory;
 - d. assigning each local copy of the document a unique user version identifier number when each user of the plurality of users accesses the document in the shared memory;